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Contractors and Engineers Monthly

Vol. 45, No. 6

JUNE, 1948

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Bridge Construction

Work on a new high-level bridge over the Connecticut River is described on page 1, and in pictures, pages 60-61.

Bituminous Paving

An asphalt plant was set up at an iron-ore aggregate deposit for the hot-mix upper-decking job reported on this page.

ARBA Road Show

A partial guide to Road Show exhibits begins on page 1 and indicates some of the many new models to be seen there.

Building Foundations

The housing project featured on page 2 called for a foundation of step-taper piles filled with truck-mixed concrete.

Concrete Paving

Pages 6 and 7 tell how a 2-lane road was laid on a select-sand cushion.

Page 69 covers a 24-foot-wide slab laid with a center safety stripe.

New Municipal Airport

The CAA, Mass., and the City of Fall River participate to build an airport under the 1947 Airport Act (page 18).

Speed Up Road Program

Only by getting J. Q. Public behind us, the article on page 22 holds, can we bring our road system up to standard.

Soil Compaction

A paper abstracted on page 26 reviews theories, methods, control, and recent trends in embankment compaction.

County Road Work

A county improves its black-top roads with bituminous seal—page 30.

Average county maintenance equipment is compared with that of states, page 66.

Levee Construction

Louisville builds 1.7 miles of earth levee—plus drainage system—to guard itself against the Ohio River (page 33).

Construction Costs

The 1947 construction-cost rise is analyzed in a paper on page 38; ways to control future costs are suggested.

Roadside Development

The article on page 42 explains how erosion was checked on mountain fills by wire mats, seeding, straw, and willows.

Diversion Tunnel

Lining a diversion tunnel with concrete, step 2 in building a Vermont flood-control dam, is described on page 46.

Highway Maintenance

A tar-gravel surface laid by force-account workers has improved 10 miles of scenic route in N.H. See page 52.

Road Grading

Reconstructing one of the country's earliest roads for 3.7 miles (page 56) required 800,000 cubic yards of excavation.

Channel Dredging

A dredge clears shoals from a harbor bottom without tying up harbor traffic. The U.S. Engineers job is reported on page 78. (You will find "In This Issue" on page 4)



Hot-Mix Topping Contains Iron Ore

Asphalt Plant Erected In Forest Over Unusual Aggregate Deposit; Radio Network Used by Key Men

✦ CHILLED to the bone by the damp south-Texas winter, the ruddy-faced man in the gray Ford coughed violently. Veteran of paving jobs for a quarter of a century, Dan Dyess had ramrodded many a winter job. This was one of the worst. As the first misty rain dampened the windshield, Dyess twirled a power knob on the instrument panel and picked up a transmitter microphone.

"Unit 3, W-10-XCX, callin' W-10-XCV. Come in."

"W-10-XCV. Yes suh, Mistuh Dyess. Oveh," crackled the response.

"Is it rainin' theah yet?" Dyess asked. "Oveh."

"It's just now stahtin', suh. Oveh."

"Tell Dennis to shut down, then, and (Continued on page 110)

A Preview of Exhibits At the ARBA Road Show

✦ "LARGEST" and "first" will be key words next month in Chicago, when the American Road Builders' Association Road Show opens at Soldier Field on July 16. Not only will it be the largest assembly of construction equipment ever seen, for the largest highway construction program ever tackled, but it will be the first show the ARBA has held since the war, the first in eight years. And the machines themselves, many of them, will be the largest and the first of their kind.

"Best" will just as surely be another key word. For the 30-acre display area at the Field will house what more than 300 manufacturers consider their best yet in equipment for building and maintaining highways and airports—their best yet in efficient and economical machines and materials. Moreover, the best tricks and techniques for getting the most out of that equipment will be demonstrated during the 9-day show.

Concurrently with the Road Show, the 45th Annual ARBA Convention will

High-Level Bridge Replaces Lift Span

(Photos on pages 60 and 61)

✦ A NEW high-level bridge to carry U. S. 1 across the Connecticut River from Old Saybrook on the west to Old Lyme on the east is now under construction along the south shore of Connecticut, about 2½ miles upstream from the mouth of the river at Long Island Sound. It is being built as a toll bridge by the Old Lyme-Old Saybrook Bridge Commission, with construction supervised by the Connecticut State Highway Department.

The new span is 2,448 feet long. It has a vertical clearance of 83.3 feet above mean sea level for the 200-foot clear horizontal width between the two channel piers 8 and 9. These two piers are near the east end of the structure, which lies nearly due east-west.

The substructure consists of 11 piers and 2 abutments, all of reinforced concrete. It has just been completed by the Merritt-Chapman & Scott Corp. of New London, Conn., and New York City. Numbered from west to east, piers 1 and 11, together with the abutments, rest on a sand and gravel foundation with a maximum soil pressure of 3.1 tons per square foot. Piers 2 through 7 are supported on steel H-beam friction piles. Piers 8, 9, and 10 are founded on steel H-beam bearing piles which were driven to refusal on granite bedrock. This stratum of rock runs along an eastern strip of the riverbed, but over the rest of the area the bottom is mostly medium sand and silt.

Work on the substructure got under way early in April, 1947, after the awarding of a \$1,179,470 contract to

River Piers Built Within Steel Sheet Cofferdams on H-Pile Foundation; Barge Carries Concrete Plant

the Merritt-Chapman & Scott Corp. The plate-girder superstructure designed for an H-20 loading, S16-44, was started March 19, 1948. It is being erected by the American Bridge Co. of New York City, which was low bidder with a figure of \$2,015,185 for fabricating and erecting some 11,600,000 pounds of structural steel. Altogether ten contracts are involved on the project, which is scheduled for completion by the end of this year. The total cost will come to around \$6,500,000.

Replaces Lift Span

Until the new bridge is finished, traffic is being carried on the old two-lane steel and wood structure which was built across the Connecticut in 1911 to replace a ferry. The 37-year-old span, besides being two lanes too narrow for the traffic, is also the scene of many a bottleneck when the lift span is raised for river boats. Moreover, the element of danger is always present in these movable spans. One dark night, a short time ago, a car got past the gateman and began to climb the rising leaf of the bascule span as it was being lifted for river traffic. In this case, fortunately, the law of gravity prevailed. The car slid back, crashing into the deck of the adjoining fixed span, rather than catapulting itself out into the channel.

Motor traffic will be speeded on the new bridge. It will have two 26-foot roadways of 7-inch uniform-depth con- (Continued on page 12)



To build a bridge pier 240 feet out in the Connecticut River, Merritt-Chapman & Scott Corp. ran a timber ramp through the columns of this land-based pier to form a work bridge.

Guide to Some of Equipment Which Manufacturers Will Exhibit at Soldier Field, Chicago, in July

also be held in Chicago, at the Stevens Hotel. There more than 1,000 road builders from all over the world will hear international authorities discuss all phases of street, highway, and airport construction.

Included in the topics to be offered will be an explanation of government highway organization through the Federal, state, and county levels; historical aspects of highway development in this country since 1900; descriptions of methods of finance and administration; value of modern design, research, and methods of construction; and the importance of equipment in road building.

Guide to Road Show

For those planning to attend the Road (Continued on page 85)

Big Housing Project Has Pile Foundation

Step-Taper Shells Driven By Four Steam Rigs, Then Filled With Truck-Mixed Concrete Before Capping

By WILLIAM H. QUIRK,
Eastern Editor

♦ A FOUNDATION of step-taper piles filled with concrete was completed in the spring of this year for the Lillian Wald Houses on New York City's lower east side. This construction phase of the big 16-apartment-building housing project took a winter of steady pushing. Between October, 1947, and April, 1948, 6,470 piles, averaging 72 feet in length, were driven by four steam pile drivers mounted on crawler treads.

The New York City Housing Authority is building this low-rent housing development under a loan contract with the New York State Division of Housing. The builder and general contractor is the HRH Construction Corp. of New York City, which has already built three other large housing projects. The Raymond Concrete Pile Co., whose work is the subject of this article, had a subcontract for the pile foundations. The same company recently completed pile foundations for the Jacob Riis Housing Project located directly north of the Lillian Wald Houses.

Lillian Wald Houses

The new housing project is located on a tract of land which contains 16½ acres formerly occupied by slums and tenement houses. It extends northward from East Houston Street to East 6th Street, and from Avenue D eastward

to the East River Drive in lower Manhattan. The cost of the land alone was \$3,793,441. Of all the original buildings on the site, only a public grammar school remains.

The 16 new apartment buildings of reinforced-concrete construction will be from 12 to 14 stories high. They will house an estimated population of 6,955 in 1,861 separate apartments. The number of full and half rooms to be constructed totals 8,308. While not identical, the buildings are similar in shape and size and average 165 feet long x 91 feet wide, the extreme outside dimensions. They take up an area of 126,236 square feet. The project will have a population density of 423 persons per acre.

Besides the school, the only other non-dwelling building on the site is a reinforced-concrete 1-story structure which contains the central heating plant and coal storage. This building is supported on 288 wooden piles, 18 feet long. The cost of the building construction alone is approximately \$12,000,000. This figure does not include electrical and heating installations, or any landscaping of the site.

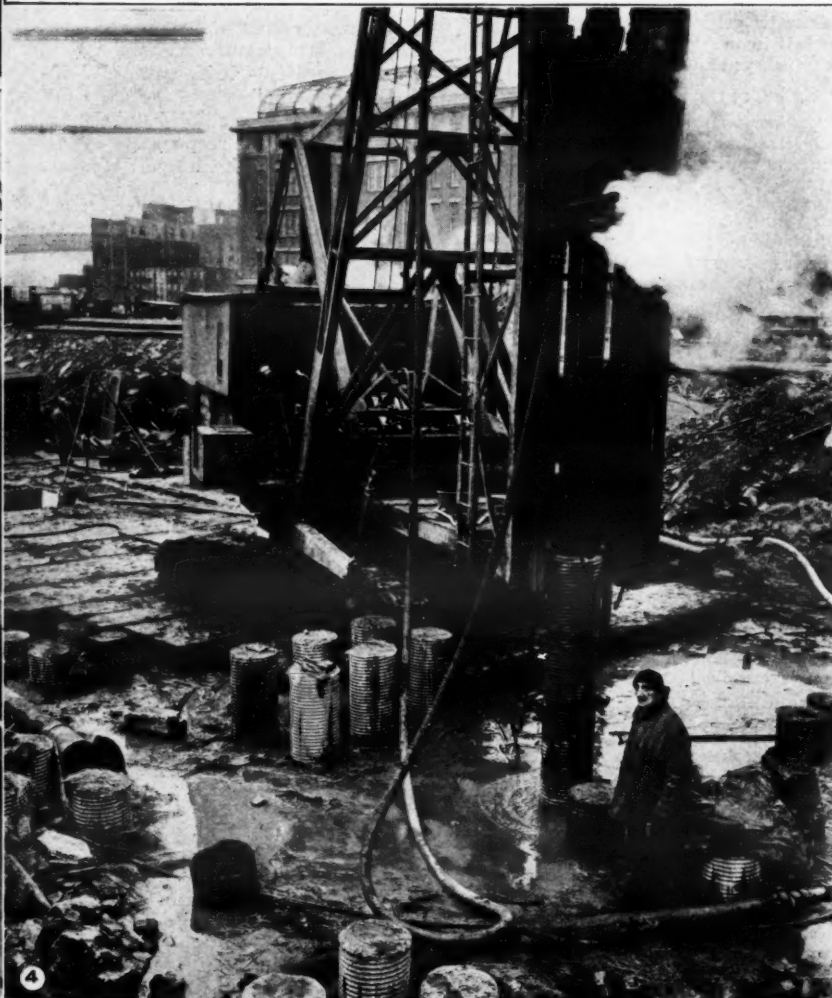
Filled-In Land

Early in the history of New York City, the greater portion of the present housing site was still in the East River. Over the years the low-lying area has been reclaimed by filling in the land, and pushing the river back beyond the present East River Drive. This substratum presented difficulties to the foundation contractor when it came to driving piles. While about the upper 15 feet of ground consisted of filled-in

(Continued on page 105)

In photo 1, a Raymond rig drives pile foundations for the Lillian Wald housing project on New York City's lower east side. In the background is the Jacob Riis housing project for which Raymond Concrete Pile Co. also drove pile foundations. Photo 2 shows the jetting operation which preceded pile driving. In photo 3 you can see the Raymond-designed sleeve which connects the pipe sections with the step-taper shell used on longer composite piles. And photo 4 is a close-up of the Raymond pile hammer on a timber mat, working on Building 3 of the project.

C. & E. M. Photos



Here's proof

that upkeep cost is low when you
pave with Texaco Asphaltic Concrete



U.S. Highway 81, south of Austin, Texas, served by resilient, heavy-duty Texaco Asphaltic Concrete paving, laid by Public Construction Company of Denton, Texas, in 1936.

Maintenance on this 12-year-old pavement
averages \$158 per mile per year*

From Austin to San Antonio, Texas, a distance of 77 miles, U.S. Highway 81 is paved with a variety of types of construction. This presents an excellent opportunity to compare the performance of the different pavements when subjected to the same set of conditions.

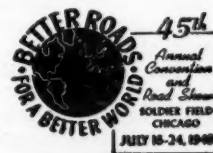
For example, comparative maintenance costs on this 77-mile section of one of Texas' principal north-south routes are worth noting. The records reveal that upkeep on the 12-year-old Texaco Asphaltic Concrete pavement shown here has been far lower than on any other pavement type represented. Serving a traffic of 6,190 vehicles a day, this Texaco-paved section has cost the state an average of only \$158 per mile per year for upkeep.

For the information of highway engineers, the Texaco Asphaltic Concrete pavement on U.S. 81 was laid in three courses, having a combined thickness of $4\frac{7}{8}$ inches. The sub-base is 10 to 12 inches of gravel.

Its low upkeep cost is one of the chief reasons for the nation-wide use of resilient, joint-free Texaco Asphalt paving on streets and highways for more than 40 years.

Two helpful Asphalt booklets will be sent to those interested. One describes "Road Building with Texaco Asphalt by the Pressure Distributor Method." The other covers "Plant-mixed Types of Texaco Asphalt Paving." Write our nearest office for either or both booklets.

*Includes cost of maintenance on shoulders, as well as the pavement proper.



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TEXACO ASPHALT

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Full Use of Skills Urged by Engineers For New Draft Law

Insurance against wasting technical training and experience was urged upon the House Committee on Armed Services, in connection with its study of a proposed draft law, in a statement approved by the Engineers Joint Council. Emphasizing that the Council was not asking for unwarranted deferment of engineers, the statement asserted that "we are pleading for the use of engineers in their most effective capacity, to guarantee that the country receives the greatest good from this small, highly trained group of citizens".

The House Committee was urged to establish a special committee, similar to the one created late in World War II, to examine all deferment cases involving engineers, scientists, and technologists. The committee would establish procedures for deriving the most effective use of each man, based on his training and experience, utilization at the highest level of his abilities, and the importance of his work in the national interest.

Outlining the types of work for which engineers are trained, and pointing out the part they played in World War II, the statement emphasized that during war only a relatively small number of engineers are needed in combat service. It also pointed out that if there is to be a need for industrial mobilization, the engineers would be called on to implement a preparedness program at a time when they already face the gigantic task of industrial reconversion amidst materials shortages and a shortage of engineers because of war-interrupted studies. The statement pointed out that "if 50,000 engineers were in uniform in the next war, and 20 per cent of them... were not used as professional men, this country would waste at least 80,000 man-years of engineering training and experiences". This 20 per cent, or 10,000 engineers, would represent only a drop in the bucket compared to the total man-power requirements.

The Engineers Joint Council is made up of officers of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, and the American Institute of Chemical Engineers.

Engineers, says Harvey N. Davis, President of Stevens Institute of Technology, practice in many other professions. One, cited by President Davis, is a dentist specializing in bridge work! And he claims that building a bridge across a river and building one across a 1/4-inch gap in a mouth are one and the same problem. In both cases, one deals with loads and bending moments and abutments and thrusts against them. The only real difference seems to be, he says, that in the case of the bridge across a river one can usually count on the abutments being fairly well fixed in position.

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Reducing the Risk in Soil Compaction

More and more these days, among contractors big and small, we hear comment which favors payment for soil-compaction machines by the hour. This is especially true in the case of sheep-foot rollers, commonly used on highway and dam embankments.

In gatherings and on the job, this line of thought seems to be gathering momentum. Even at contractors' conventions, when the subject arises, it is apparent that some contractors want to take the gamble out of soil compaction.

We cannot help believing that this line of thought may boomerang against the men who profess it. For if rolling equipment ever starts to work on a per-hour basis, why not excavating equipment? Why not hauling machines? Why not all the job operations? Finally, then, why have the contract system?

We appreciate that soil compaction poses many uncertainties. But the solution to those uncertainties does not lie in payment by the hour for the machines involved in the operation. The solution is not the elimination of risk from soil compaction, any more than the elimination of risk from general contracting is sound business.

A common-sense solution, it seems to us, would be something like this. Specifications would state the desired results, indicating minimum and maximum limits of tolerance, and might even suggest methods and equipment. They would be clear, easy to understand, leaving no room for argument. They would be based on actual soils studies made for a particular job.

They would provide as a contract item the processing, watering, and rolling. If they included the minimum number of passes which, according to the studies, should give a result midway between the limits of tolerance, this should be part of the contract. If this amount of compactive effort failed, then additional roller passes could be ordered by the resident engineer and extra payment be made by the hour. Not before.

We believe that soil compaction

should continue as a contract pay item—and that it should continue that way at the insistence of contractors who take the risk.

Not a small part of the trouble with soil compaction is the multiple set of standards in current use for types of rolling equipment. At a recent convention in San Francisco, a sheep-foot-roller manufacturer pointed out that no state highway department or Federal agency has standard specifications for this type of roller. One agency, in fact, changed its standards by a few points when confronted with another agency's similar requirements.

How much longer are we going to measure compactive effort by so many yardsticks? How much longer must the public cost of earth compaction remain at present high levels, simply because the procedure has not been even generally standardized? Correlating the behavior of various types of soils should be a relatively easy task, if observed under the same compactive instrument. But when viewed under the action of as many types of rollers as there are contracting agencies, small wonder the task has become a seemingly insurmountable one.

We believe these multiple standards have confused even a great many testing engineers and writers of specifications. In large measure, it is these factors which put the gamble in soil compaction; not the soil itself.

The solution would seem to be in the direction of more standardization in equipment, careful studies of the soils on each job, and inclusion of results desired in the contract specifications. In this way, the cost of compaction equipment could be reduced; and contractors, with a reasonable knowledge of the soil problems on any given job, could use their know-how to achieve the specified results. This should lick the problem. Moreover, it is in keeping with the established contract system which gives the taxpayers of this country the most efficient construction of public works at the lowest possible cost.

Civil Service Call Issued for Engineers

Civil Service examinations have been announced for filling engineer positions in various federal agencies in Washington, D. C., and in the Bureau of Reclamation in the states of Oregon, Washington, California, Arizona, Nevada, Idaho, Montana, Wyoming, Colorado, New Mexico, Utah, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

The salaries for engineer positions in Washington, D. C., range from \$3,397 to \$5,905 a year. No written tests will be given to applicants for these positions. To qualify, they must have had college study or experience in engineering or a combination of such study and experience. In addition, they must have had professional engineering experience. Detailed information is given in Announcement No. 95. Applications must be received by the U. S. Civil Service Commission, in Washington 25, D. C., at a date not later than December 31, 1948.

Written tests will be required for positions with the Bureau of Reclamation, which pay \$2,644 a year. Applicants must have completed appropriate college study in engineering or must have had technical engineering experience, or a combination of such study and experience. Applications will be accepted from students who expect to complete their college courses not later than October 1, 1948. Detailed information is given in Announcement No. 13-1-2 (1948).

Announcements and application forms may be secured from the U. S. Civil Service Commission, Washington 25, D. C.; from Civil Service regional offices; or from most first and second-class post offices. Applications for positions in the Bureau of Reclamation will be accepted until further notice, by the Executive Secretary, Central Board of U. S. Civil Service Examiners, Bureau of Reclamation, Denver Federal Center, Denver, Colo.



C. & E. M. Photos

After 12 inches of rain between March 31 and April 1, a 15-acre piece of ground on a farm in Gadsden County, Fla., sank 45 feet (first photo). This prank of nature moved Flat Creek 300 yards by filling the site of its original bed with earth as shown in the second photo.

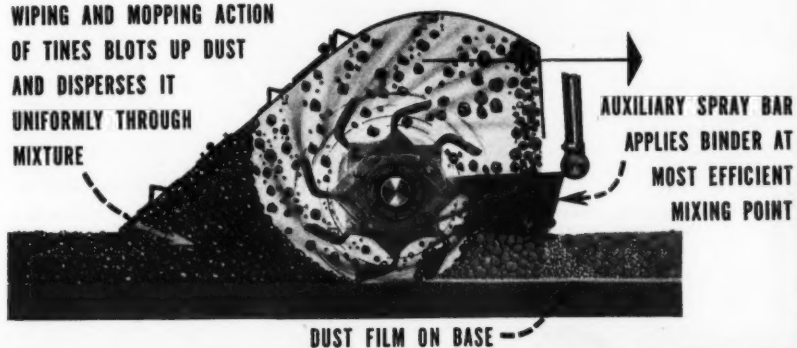
C. & E. MONTLY's camera catches farm owner W. D. Pitts, 64, (third photo, standing at right) reflecting on his 3-acre loss of tillable land and 12-acre loss of timber worth \$1,000, while neighbor H. W. Clark deposits money in a collection tin to try to help him out.

WHY A SEAMAN-MIX IS A Superior mix....

Analysis of the SEAMAN MIXER'S Action

Sweeping, Mopping, Raking and Blotting the SEAMAN Mixes-in Sub-base Dust film that Otherwise Prevents a Pavement Bond.

WIPING AND MOPPING ACTION OF TINES BLOTS UP DUST AND DISPERSES IT UNIFORMLY THROUGH MIXTURE



DUST FILM ON BASE

Raking, sweeping and mopping,—over 15,000 tine contacts per minute remove every particle of dust from the sub-grade and bring it into the mix. As rotor moves ahead, dust-film on sub-grade is completely removed and becomes a homogenous part of the thorough mix.

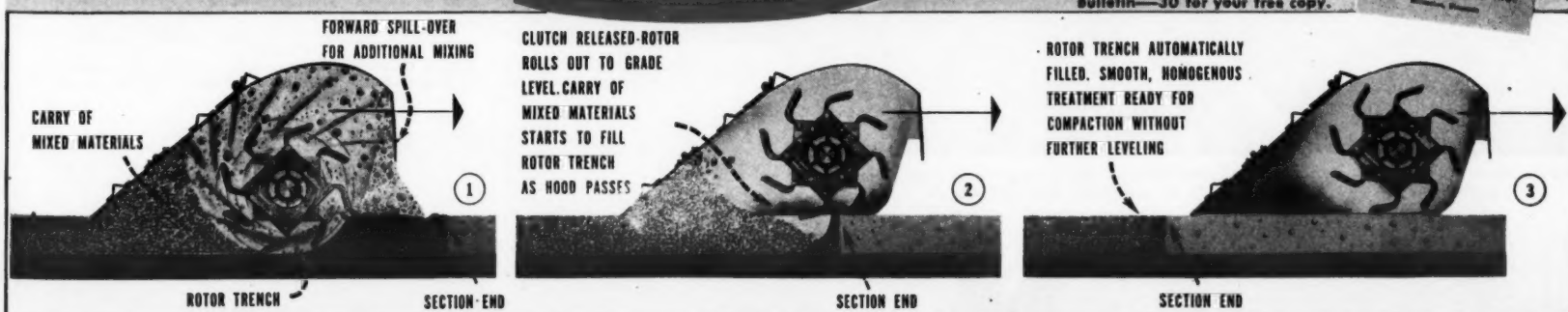
The "Carry" of Mixed Materials Smoothly Fills and Levels Each Section End.

THERE'S an all-directional tornado of road materials created by the revolving tines within the mixing chamber. Tines are pitched and staggered to force a crossing movement to left and right as well as an upward throw. This action in itself achieves an excellent mix. Next, deflection from the scientifically curved hood throws a high percentage of the materials back into the rotor for further mixing action while another substantial portion is thrown ahead of the rotor in a heavy spill-over where it is again re-mixed as the rotor moves ahead. The tumbling and rolling action of the materials comprising the large "carry" of mixed materials within the hood's trailing edge adds further mixing, while the wiping action of the trailing edge itself intensifies the coating of the aggregate.

Here's a brand new Bulletin,—just off the press, describing a variety of highway SHOULDER TREATMENTS,—including the newest practices in stabilized turf shoulders and other economical techniques which develop a high load bearing shoulder stabilization. Ask for Bulletin—30 for your free copy.

HIGHWAY SHOULDER IMPROVEMENT METHODS

Bulletin No. 30
SEAMAN MOTORS, INC.
MILWAUKEE, WIS.



Showing normal mixing position of materials and rotor as the SEAMAN approaches existing pavement marking end of a new construction section. Notice large "carry" of mixed materials, held within trailing edge of hood.

Clutch is released at section end. Rotor rolls out of mix and up on pavement (or on ground surface). The "carry" of mixed materials is beginning to fill the rotor trench as the SEAMAN moves ahead.

Rotor trench is now completely filled with mixed materials, smoothed and leveled by trailing edge of hood. A feature of a SEAMAN-mix: it is ready for compaction after processing.

More Miles of Construction
FOR YOUR ROAD BUILDING DOLLAR

SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN

Concrete Slab Laid On Selected Cushion

(C. & E. M. Photos)



Thanks to this piece of good contractor public relations, even a 4-mile detour didn't ruffle the tempers of motorists when they came to Northwestern Engineering Co.'s concrete-paving job on U. S. 14 outside of Rapid City, S. Dak.



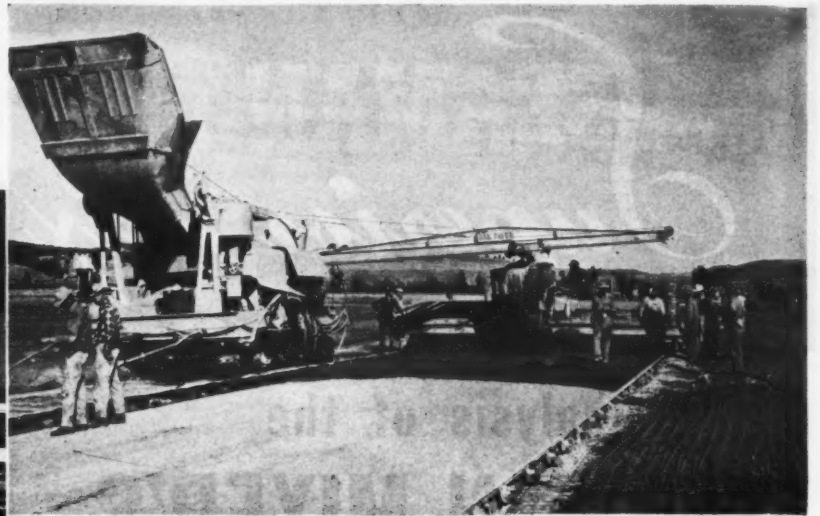
Job feature was a select-sand base course to improve stability and drainage. Here an FWD truck end-dumps a load of the material which was dug from a hill about 2 miles from one end of the 4.5-mile project.



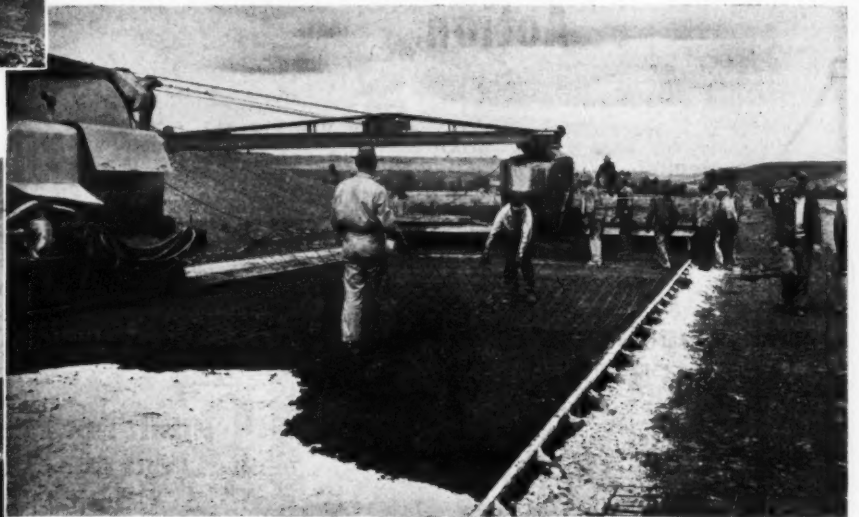
Next a Caterpillar No. 12 motor grader smooths out the piles of fine sand. They looked enough like brown sugar to be packaged and sold for it.



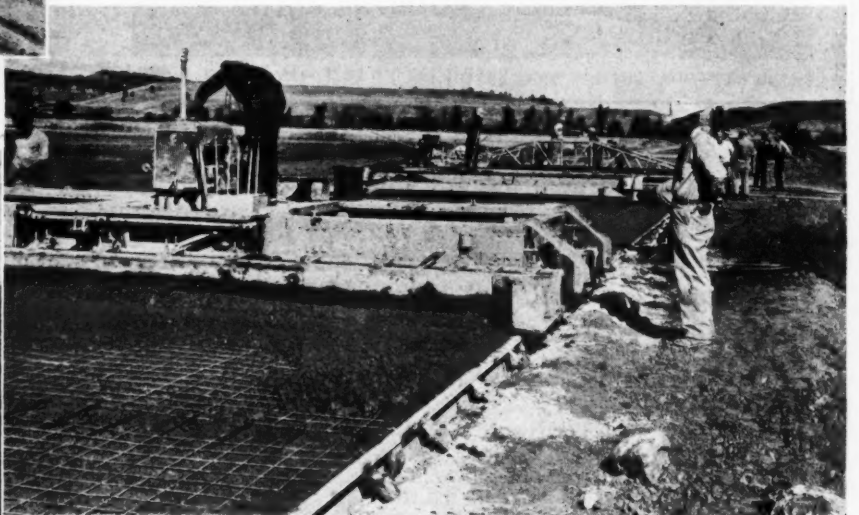
A Buffalo-Springfield tandem steel roller compacts the sand blanket to a minimum density of 110 pounds per cubic foot—95 per cent of its optimum density.



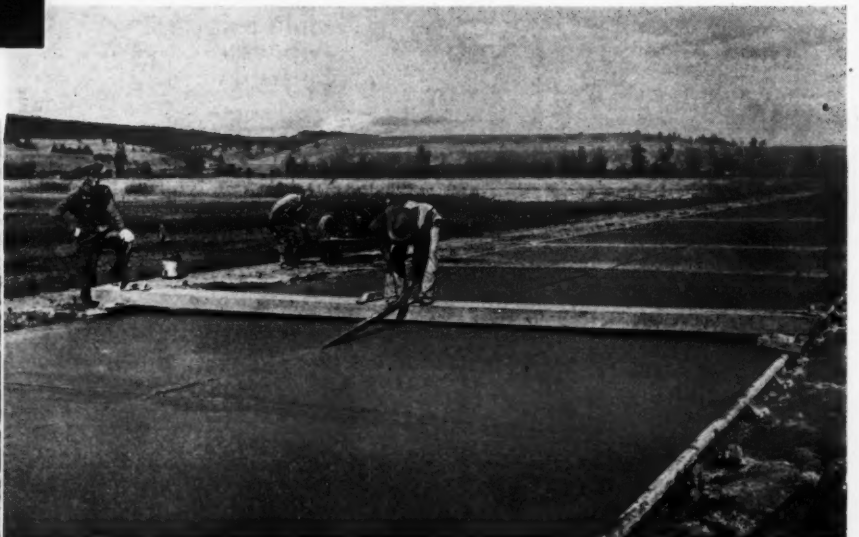
On top of the sand cushion, a Rex dual-drum 34-E paver dumps a load of concrete, at the same time raising its skip to charge the drum with more material.



With concrete leveled off about 2 inches below the top of the forms, workmen place steel-mesh reinforcing mats. The rest of the 9-6-9-inch slab will go on top.



Beside the Blaw-Knox spreader, which traveled over the slab next, is Resident Engineer L. H. Doscher. Behind are the Jaeger-Lakewood and Koehring finishing machines.



When the concrete had its initial set, workmen removed the steel joint-protection strips. The rig shown here behind the wood bridge applied Cecure concrete-curing compound.

Concrete Slab Laid On Selected Cushion

Two-Lane Concrete Paving On U. S. 14 Is Laid With Special Mat of Select Sand to Give Stability

By RAYMOND P. DAY,
Western Editor

A 9-6-9-INCH portland-cement concrete highway, laid on a select-sand cushion 22 feet wide, was built last season for the South Dakota State Highway Commission by Northwestern Engineering Co. of Rapid City. One of the first modern concrete roads to be built in the western part of the state, the new highway embodies, in particular, the use of fine sand to form a bearing cushion from 3½ to 5¼ inches thick.

The \$275,354 contract was located on transcontinental U. S. 14 and stretched from the west city limits of Rapid City to a point 4.5 miles farther west. The job marks a step in the realignment and modernization of the existing road between Rapid City and Sturgis. Northwestern Engineering Co. recently finished a similar contract extending southeast from Sturgis.

The contract, financed by state and Federal-Aid funds, included 58,312 square yards of concrete pavement on the 4½-mile section of 22-foot slab, some 158,060 cubic yards of grading for the roadway embankment, four box culverts, the preparation of 12,977 tons of select-sand base course, and about 10,400 tons of stabilized gravel in place for the new shoulders along the slab.

Design of New Pavement

The new pavement was designed with a thickened edge of 9 inches, tapering in 4 feet to the 6-inch thickness of the remainder of the slab. The top of the concrete was crowned 1½ inches on a straight taper from edge to center line.

The fine select-sand sub-base cushion, 3½ inches thick at the pavement edge and 5¼ inches thick in the center, was designed to add to the bearing properties of the new slab as well as furnish a certain amount of drainage. The drainage factor was considered significant enough so that French drains connect the select blanket to the outside of the shoulder at the foreslopes.

In addition to this, the pavement is reinforced by 10 x 12-foot mats of 6 x 6 x ½ steel mesh wire, laid with a longitudinal lap of 24 inches to make the steel as continuous as practicable. This steel was placed 2 inches under the surface of the concrete.

Formed contraction joints at 30-foot centers, with 1-inch mastic expansion joints and dowels on 180-foot centers, were further provisions of the plans. The contraction-joint cracks, about ¾

inch wide by 3 inches deep, were poured with asphaltic joint filler, as was the open joint over the expansion material.

The new section of highway extends through rolling terrain at the edge of the Black Hills, through a country whose geology is particularly interesting. Great deposits of petrified wood, fossils, and a variety of rocks and soils are found in this vicinity.

Tractor Equipment for Grading

Grading of the new embankment posed problems in handling both earth and rock. The deepest cut on the job, however, was only 40 feet, and it extended down through a red shale which tractor equipment could dig.

About two carloads of 40 per cent powder had to be used on the rocky



C. & E. M. Photo

This one set-up of the batch plant was enough for Northwestern's 4½-mile job. A cement truck unloads at the Butler bulk-cement bin. Rock and sand bins are in back.

pinnacles in some of the cuts. Two Cleveland wagon drills and six Ingersoll-Rand Jackhammers sank the holes. They got their air from an Ingersoll-Rand and a Gardner-Denver compressor, both 500-cfm machines.

For the most part, the excavation was

handled by five Carryalls, two LP's and three Model W's, each pulled by a D8 Caterpillar tractor. With one D7 bulldozer and a D8 push tractor in attendance, the Carryalls turned out good loads of red shale, dirt, conglomerate,

(Continued on next page)



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Concrete Slab Laid On Selected Cushion

(Continued from preceding page)

and broken rock. The embankment was put up in 6-inch lifts, using a No. 12 Caterpillar motor grader to finish off and to level some of the lifts. Two 2,000-gallon water tank trucks and one smaller 1,500-gallon unit hauled water from a creek about halfway through the project. The dirt from cuts was dry, and had to be shot liberally with moisture to get the 90 per cent density required.

The grading was started August 1, and pushed rapidly to within 25 per cent of completion by September 22, the date on which concrete-paving crews started to work.

Traffic Is Detoured

A difficult phase of the job was the re-routing of traffic. While the new pavement in fully 50 per cent of its location was outside the limits of the old highway, it crisscrossed so often that it was out of the question to use the old road.

A 4-mile detour was arranged at the start of the job, taking the traffic 2 miles north and 2 miles west again to bring it back about halfway through the job. Job plans called for the pavement to be poured in half sections, leaving half the road open to traffic. However, a detour was built on the right-of-way below the shoulder, and successfully used with the application of some clever public relations.

Northwestern Engineering Co., long alert to the value of public relations, installed huge 5 x 6-foot signs at both ends of its job. These signs read "We Are Building a Fine Highway. Please Drive Carefully. Watch Out for Detours and Heavy Equipment. Thank You."

Reaction of motorists to this friendly sign was fast and favorable. Drivers slowed their automobiles down voluntarily, and, except for a very limited amount of griping, they seemed happy to cooperate after having thus been given the facts. The detour road which carried all the traffic made up in public relations what it lacked in comfort or riding quality.

Batch-Plant Set-Up

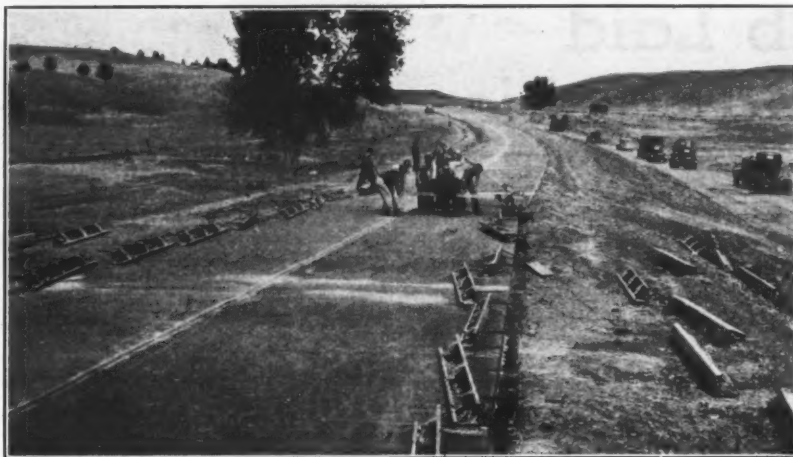
One set-up of the job batching plant was enough to do the 4½-mile section. The weighing and storage bins were spotted near the center of the project, and near the company field office.

Sand for the concrete mix had to be shipped in from Oral, S. Dak., although blanket sand was dug out of a hill locally. The concrete sand was shipped in railroad cars and spotted on a C. & N. W. railroad siding about a mile from the batch plant. A small ¾-cubic-yard Lima clamshell was used to unload the cars, and to transfer the material to dump trucks which hauled it over to the storage pile at the main batching bins.

Dacotah portland cement, in bulk, was shipped by rail for about a mile from the manufacturing plant in Rapid City, unloaded from the hopper-bottom cars to a track bin, and fed by screw-auger to the elevator on a Butler 300-barrel bulk-cement silo set up along the tracks. It was then transferred to the main batching site by covered transport trucks. With considerable demand for cement all over South Dakota last year, the manufacturing plant was generally hard-pressed to turn out anything but the newest of cement.

The two sizes of coarse-rock aggregate required for the mix were produced by Northwest Engineering Co.'s commercial crushing and screening plant about a mile east of the batch bins. As this material was produced, it was hauled up to the batching bins and dumped by the trucks.

Sand was handled by a 60-ton Butler bin, set up near the stockpile of dumped sand. The two sizes of rock were stocked



C. & E. M. Photo

Workmen on the U. S. 14 contract remove Heltzel forms with Cleveland form pullers, extracting all three pins simultaneously.

and weighed out by a 2-compartment Blaw-Knox 100-ton rock bin. A Koehring 701 crane with a 2½-cubic-yard clamshell bucket charged the sand and

rock bins.

Bulk cement at the batch plant was handled by a Butler 400-barrel cement silo.

An average of 10 K-7 International and Ford batch trucks, each machine hauling two 34-cubic-foot batches, was used to haul the dry material out to the paver. Trucks backed in under the Blaw-Knox rock bins first to take on their batches of coarse material, then drove under the cement bin for the two shots of that material, and then backed under the sand bin which covered the cement with sand and saved the usual expense of one man to cover loads.

Ordinarily, on other set-ups, Northwestern placed the batch plant in line so the trucks could drive through under each set of scales. However, the location on this job was so covered with native pine trees that working room was limited. Since the job was of comparatively short duration, it was decided to arrange the plant as outlined here.

The concrete mix was batched according to a formula which called for 220 pounds of sand smaller than No. 4, 127 pounds of No. 4 to ¾-inch pea gravel, 190 pounds of ¾ to 1½-inch

(Continued on next page)

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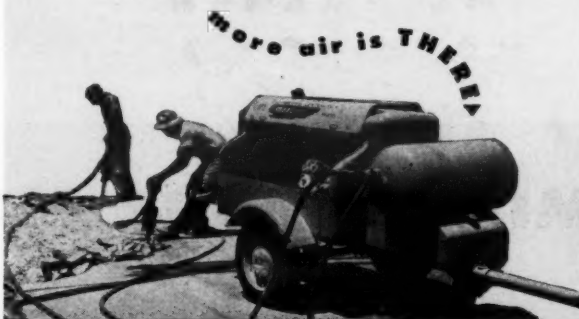


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rock aggregate, 94 pounds of cement, and 6.05 gallons of water. The plant had to handle the materials for from 1,200 to 1,500 linear feet of slab each paving day of 11 hours.

Preparation for Pour

As finished by the grading equipment, the embankment was left generally a bit high so the fine-grading machines would have something to work on. A Caterpillar No. 12 motor grader shaped the surface close to grade well ahead of preliminary work. Surveyors then came through and set the alignment and elevation hubs from which fine-grading and paving crews worked.

The trench for forms was excavated to a string line by a Cleveland Form-grader, and smoothed up, when the forms were set, by hand shovels.

Approximately 3,500 road-feet of 9 x 9-inch Heltzel standard steel forms were brought in, and kept set about 2,000 feet ahead of the paver. A crew of 15 men under a fine-grading and form-setting foreman kept the forms



C. & E. M. Photo

A State Inspector makes a test beam on the South Dakota concrete-paving job, while workmen behind him finish the slab.

moved ahead, set to line and grade, and staked. Form pins on this job were driven by air, using an Ingersoll-Rand pneumatic hammer and a small Sullivan portable air compressor.

The base of the steel forms was thoroughly tamped to solid bearing by a small Jaeger form tamper, and what little dirt fell on the form bases was left there to prevent the concrete from

sticking later on.

Fine-grading, designed to remove enough earth subgrade to make room for the select-sand blanket course, was handled by a Buckeye Power Finegrader. Riding on top of the forms, this machine pulled itself along by means of a winch-operated cable on either side, digging the dirt out to the irregular and predetermined depths for sub-base. This dirt was discarded outside the steel forms, and smoothed down from time to time by a motor grader.

The subgrade was carefully checked behind this machine by a string line and rule. Any excess dirt near the forms, which the machine failed to get, was shoveled out by two men who tended this machine.

Sub-Base Sand Put In

The special fine sand for the sub-base was dug out of a hill about 2 miles from one end of the project and hauled out to the job by six dump trucks. The material was damp when it came to the job. It had the color and consistency of light brown sugar, and could probably have been packaged and sold for that commodity—until the housewives tried it.

The sand was end-dumped and spread out evenly by a No. 12 Caterpillar grader, then heavily rolled by a Buffalo-Springfield tandem steel roller and a Galion roller. Specifications called for a minimum density of 110 pounds per cubic foot, representing about 95 per cent of the optimum density of this material. Not until it had been rolled to that density was any further attempt made to shape it.

Once it was rolled properly, however, a Carr subgrade planer was used to shape the top to exact elevation. There was little excess earth or sand to throw out, but if the planer dragged up enough to over-run its sharp blade, the men threw this excess material out to the side.

The dense, planed sand sub-base surface was firm and as smooth as a dance floor when the machines and rollers had finished with it.

Expansion joints were made up with the steel dowels on supporting chairs, and set in place 180 feet apart ahead of the paver. The mastic material was capped during the pour.

Pouring the Concrete

The batch trucks came up to the job on the outside of the forms and discharged their dry batches to the skip of a Rex dual-drum 34-E paver. It too was spotted outside the forms on the future shoulder of the highway.

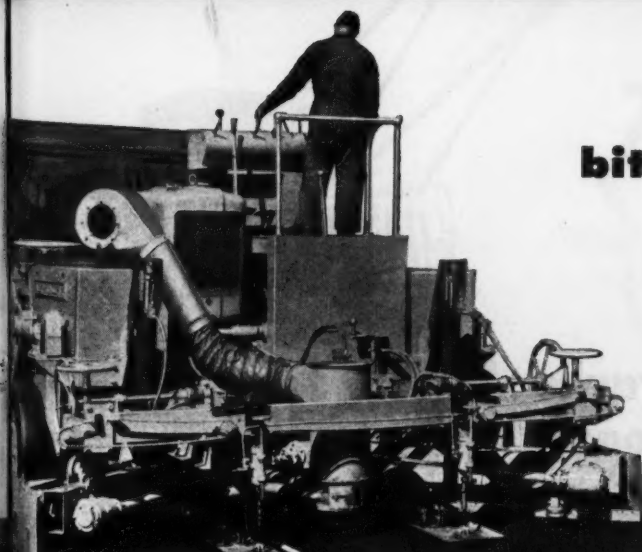
Mixing water was added at the paver drum and the material mixed 60 seconds; then it was dumped on the sand cushion. Water for the paver was pumped from Boxelder Creek, about midway through the job, by a 2½-inch CMC pump. Two 1,200-gallon truck-mounted tanks hauled this water. The trucks pulled in alongside the paver in the bottom of the drainage ditch of the new highway, and the water was transferred through flexible hose.

The concrete was dropped on the sub-base by the paver operator in such a manner that a Blaw-Knox concrete spreader could level off the surface about 2 inches below the top of the forms. Then the reinforcing mats of steel mesh were brought in from the right-of-way outside the forms by two men, and placed carefully on the concrete. The steel mats were, sometimes placed behind the Blaw-Knox spreader, but generally just ahead after that machine had moved back.

With the steel in place, the remainder of the slab concrete was dumped on top, and the concrete spread out by the Blaw-Knox machine. A surface tamping vibrator at the stern end of the Blaw-Knox spreader consolidated the mix and worked fine bits of mortar up to the surface.

(Concluded on next page)

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C. & E. M. Photo
Resident Engineer L. H. Doscher (left)
and Superintendent J. B. Dixon knock
off work for a minute to oblige the
C. & E. M. cameraman.

Concrete Slab Laid On Selected Cushion

(Continued from preceding page)

Concrete Finishing

The next machine to work on the concrete surface was a Jaeger-Lake-wood horizontal-type double-screed finisher. Several trips of this machine worked out most of the inequalities of the surface. Then a Koehring Longitudinal Finisher came along to put the final mechanical finish on the slab.

All three of these machines were carefully worked over just before paving began on the Rapid City job. Clearances were checked, and the finishing screeds were taken off and adjusted in a huge press to absolute accuracy. The result seems to be a smoother riding slab for the effort involved.

A small center-joint bridge, pulled along by the Koehring finisher, cut the center slot with a stationary knife attached to its frame. Steel slot forms, 2 inches wide at the top and tapering to 1/2 inch 2 1/2 inches deep, were set in place and driven flush with the concrete surface by the operator of the small machine. The transverse joints were cut by a bar just behind the Koehring finisher, and steel pieces 1/4 inch by 3 inches were driven down in the slot. All of this steel was removed later, as soon as the concrete took on its initial set.

Four finishers then hand-finished the slab surface over the transverse and longitudinal steel protective devices. Long-handled wooden bullfloats were

first used, to smooth up the concrete surface. Then the edges of the slab at the forms were rounded by 5/8-inch-radius edging tools, and a final herring-bone effect pulled on by two canvas belts. It was also planned, when the project was visited, to get a set of long-handled steel or aluminum bullfloats to put an even better surface on the concrete. Wood floats tend to wear badly in the center, and require constant checking for accuracy.

After the concrete had taken on its initial set, the steel protection for joints was lifted off by a man on a small wooden bridge. Any concrete dislodged at that time was carefully dressed by one of the finishers, to leave a smooth and workmanlike job behind.

A Sears-Roebuck power spray on either side of the slab was then put into play to shoot the surface with Secure concrete-curing compound. Later on, the concrete surface was checked by state inspectors, who allowed a tolerance of 1/8 inch on a 10-foot straight-edge. The few high spots were ground

off by a Berg concrete-finishing machine.

Two Cleveland form pullers were used simultaneously by the form gang, and each form section was extracted bodily by pulling form and all three pins at once. The steel sections were cleaned by shovels, loaded to a flat-bed truck, and moved ahead to be reset.

At the time this job was visited, shoulder work had not begun on the highway. However, officials in charge expected to bring in the gravel, end-dump it from trucks, mix it thoroughly with water, and then roll the material down in 3-inch lifts by pneumatic rollers.

Personnel

Bearing the Federal-Aid project number of SN-FA 100(8), the Rapid City job was designed and administered under the general supervision of H. C. Rempfer, State Highway Engineer, R. K. Morrell was Construction Engineer, and L. H. Doscher was Resi-

dent Engineer.

For Northwestern Engineering Co., big J. R. Dixon was General Superintendent in charge of the actual construction of the job. Grading was supervised by Randall "Doc" Savage, Red Bentz was in charge of form work, R. C. Mathern was the Concrete Foreman, Doc Sauter had charge of the batch plant, and H. W. Johnson was the Fine-Grade Foreman.

The finished highway, one of the first few sections of portland-cement concrete pavement in western South Dakota, will speed local and intermountain traffic on its way, and it marks another milestone in South Dakota highway construction.

Jaeger Regional Mgr. Dies

E. G. Mandt, Southern Regional Manager for The Jaeger Machine Co., died recently at his home in Birmingham, Ala. Mr. Mandt was 56 years of age. He had covered Jaeger's southern territory since 1935.

Cut TRACTOR COSTS one-half with an Ottawa Hydraulic Front End Loader

Tractors used 1/2 the year cost twice as much to own as tractors used all year 'round.

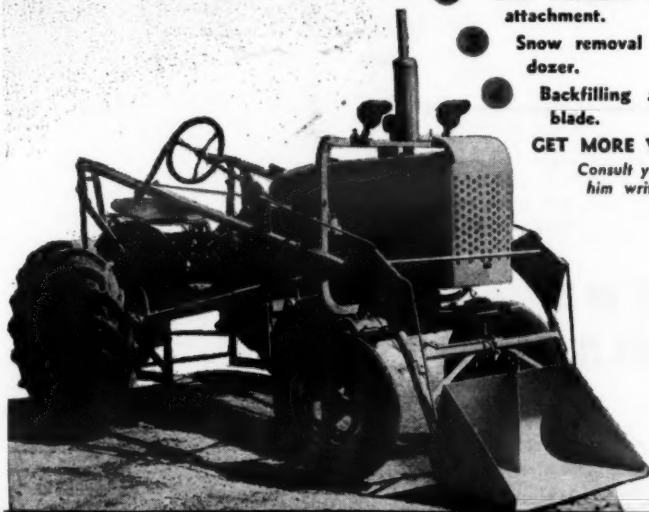
There is an Ottawa loader designed for use with light industrial tractors such as the International A and Case V A I illustrated here. These loaders have been approved by Industrial Engineers of leading tractor manufacturers.

These Ottawa Loaders and their attachments have enabled State highway departments and other light industrial tractor owners to cut light tractor operation costs over 1/2. Keep your tractors working all year 'round. Here are some of the jobs the Ottawa Hydraulic Front End Loader will make it possible for your light tractors to do when they would normally be idle.

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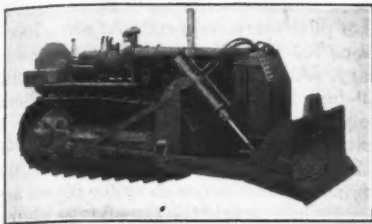
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Balderson's hydraulic bulldozers are available in styles to fit current and non-current Caterpillar tractors without alterations.

Bulldozers to Mount On Old, New Tractors

A line of hydraulic bulldozers and snow plows is made by the Balderson Mfg. Co., Wamego, Kans. The bulldozers are available in styles to fit current and non-current Caterpillar tractors without alterations. Blades are made for the D2 and R2 in 40 and 50-inch widths; for the D4 and RD4 in 44 and 60-inch widths; for the D6, RD6, R5, 40, and 35 in 56 and 74-inch widths; and for the 50, RD7, and D7 in 60 and 74-inch widths. Hydraulic units for these bulldozers are made by the LaPlant-Choate Mfg. Co.

Straight-blade dozers now in production feature double-beveled reversible cutting edges, end bits on the D6 and D7 sizes, sturdy radiator and hydraulic-unit guards, and direct-connected hydraulic units. Extras include a float-position valve, depth-regulation shoes, and an additional valve for combination dozer and scraper use.

Among the styles of snow plows Balderson furnishes are V-type with wings, V-type, reversible-blade, snow plows for LeTourneau Angledozer, plows for Trackson Traxcavators, plows for motor graders, and one-way plows for motor graders. Models are available for use with either crawler tractors or trucks.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 21.

Two Diesel Engines Mounted as Twin Unit

A Twin 4 diesel-engine power plant is now available from the Detroit Diesel Engine Division, General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich. It consists of two 4-cylinder GM Series 71 diesels mounted side by side on a common base and geared to a single output shaft. It is rated at 170 continuous brake horsepower.

The Model No. 8-103 Twin 4 units are offered with either right or left-hand rotation, and may be equipped with electric, air, or gasoline starting devices. The multiple engines are made possible by the symmetrical cylinder block on the Series 71 engines, which permits principal accessories to be mounted on either the right or left-hand side. Parts on all the Series 71 engines are interchangeable.

Four power take-off arrangements have been provided for the Twin 4 engines: (1) A heavy-duty power take-off designed to take a pulley or chain-drive side thrust without the need of a special cradle-mounted sheave or sprocket. (2) A stub shaft which is said to accommodate any of the various types of couplings encountered with heavy-duty industrial machinery. (3) The O-size SAE housing which is designed to support any close-coupled power take-off within the proper horsepower range; it is particularly recommended by the company for applications with torque converters. And (4), the drive-flange type for installations where the driven machinery is to be coupled directly to the power unit. Transfer gear cases may be obtained with gear ratios of 1:1, 1.33:1, 1.76:1, or 2:1.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 87.

Organic Detergent Cuts Grease and Mud

An organic alkyl aryl detergent said to provide certain hydrocarbon solvents with soap-like properties is announced by The Curran Corp., S. Canal St., Lawrence, Mass. According to the manufacturer, this detergent can be added to diesel fuel, light fuel-oil distillate, kerosene, or similar solvents.

The compound is recommended by Curran for cleaning equipment encrusted with mud and grease. The liquid concentrate is mixed with the solvent in a ratio of about 100:1 according to the manufacturer, and the compound is then sprayed over the equipment to be cleaned. When the compound has penetrated the grease and

mud, the equipment is rinsed by sluicing with plain water. The solution will not harm painted surfaces, the company points out.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Oil-Conditioners Catalog

The principles of oil filtration and their applications to modern-day engines are discussed in a general catalog put out by Winslow Engineering Co., 4069 Hollis St., Oakland 8, Calif. This catalog is divided into three parts: the first covers filtration principles and filter specifications; the second describes the Winslow replacement elements; and the third lists the Winslow filters and

elements for gasoline and diesel engines.

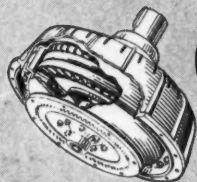
This large catalog discusses all phases of the theory and operation of filters, and is thoroughly illustrated with drawings and photographs. The features and operation of the various Winslow filters are shown, and the types for use with specific engines are identified.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 95.

"Armco" Adopted Officially

The name of the American Rolling Mill Co. is officially changed to the Armco Steel Corp. There is no change in the name of Armco Drainage & Metal Products, Inc., a subsidiary of the company.

THE "820" IS ALWAYS ready for rock... BECAUSE THE HYDRAULIC CLUTCH



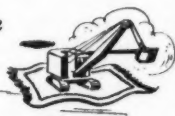
Absorbs Shock

The inevitable and unavoidable shocks and impacts, resulting from heavy-duty digging never faze the Lorain-820 because its Hydraulic Clutch absorbs and cushions the costly strains and stresses on the mechanism and cables.



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The Lorain-820 is a smooth operator because the Hydraulic Clutch eliminates shake and shock.



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You can "slug it out" with rock knowing that the Lorain-820's greater digging power won't fade or fizzle but will "hang on" until the most unyielding rock is in the dipper.



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The Lorain 820

High-Level Bridge Replaces Lift Span

(Continued from page 1)

crete deck slab, separated by a raised 4-foot center mall. There will be a 3-foot sidewalk on each side. From each end of the bridge a 3 per cent grade climbs to a high point midway on the span between piers 8 and 9. The 83.3-foot vertical clearance at this span is sufficient to accommodate all traffic on the Connecticut, which is navigable as far north as Hartford with a 15-foot depth of channel. Under the channel span the water is 35 feet deep. The new bridge is located about 100 yards downstream from the existing span, and about 1,500 feet north of the New Haven Railroad bridge. Tolls will be charged on the high-level structure until the cost of construction has been met. This is expected to take 30 years.

Starting from the west abutment the new bridge has three continuous spans of 144, 168, and 168 feet, followed by four continuous spans of 240 feet each. Then come three continuous spans of 240 feet, with two continuous spans of 144 feet each remaining to complete the 2,448 feet between abutments.

Land Work First

At the start of the job the contractor devoted his attention first to the construction of the abutments and piers 1, 2, 3, 4, 10, and 11, which could be classified as land based operations. Piers 5 through 9 were built entirely with floating rigs, working from west to east.

The abutments are U-shaped structures of reinforced concrete with footings which average 80 feet long x 19 feet wide x 4 feet deep. On the west abutment the wings extend back 62 feet, and on the east abutment 44½ feet. The walls are 5½ feet thick, and are 34 feet in height above the footings on the west side, and 30 feet high on the east.

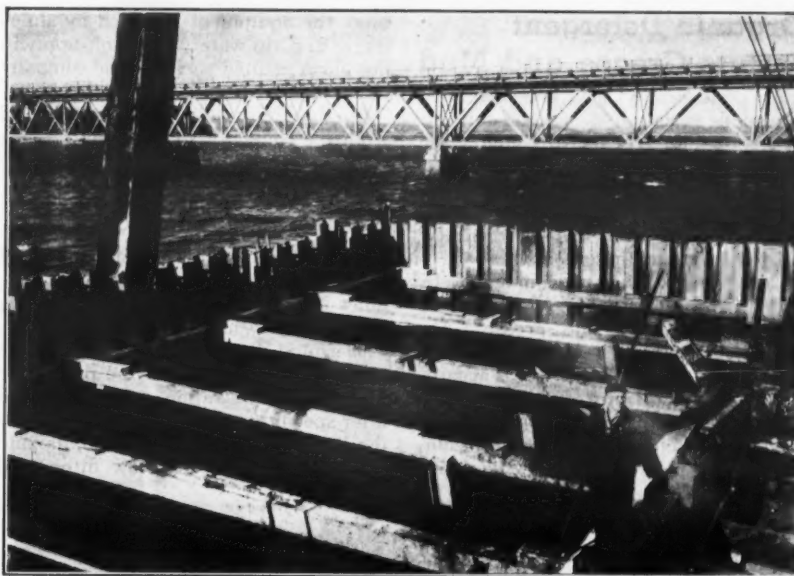
Piers 1 and 11, well back on land, required no piling. They have 54 x 18 x 4-foot-deep footings which support distribution beam slabs, 49 x 13 x 6 feet high. From this slab, or block, rise twin symmetrical piers on 36-foot centers; they are 15 feet high at pier 1 and 25 feet high at pier 11. At the top the piers are 7 feet square, and taper down to the base on a natural tangent. Pier 2—also some distance from the river, which is about 1,700 feet wide at that point—has twin 30-foot-high columns, which, like the others, are open at the top.

Pier 3 is at the water's edge, while pier 4 is 240 feet out in the stream. The latter was built by running a timber ramp through the columns of pier 3 and making up the remainder of the distance with two deck scows. This served as a work bridge from which cranes, pile drivers, trucks, and concrete mixers operated.

Dry batches of concrete were obtained from Campanella & Cardi Construction Co. of Providence, R. I., which also had a contract on the project for the east approach fill, including two bridge structures. From the batch-plant set-up at Old Lyme, trucks hauled the dry materials over the old bridge to the west abutment and piers 1, 2, 3, and 4. They backed out on the scows to reach pier 4. For the pours at the east abutment and piers 10 and 11, the haul was shorter since the river did not have to be crossed. Concrete was mixed in two MultiFoote pavers, a 27-E on the east side and a 34-E Duomix on the west side.

River Piers

Both the friction piles supporting piers 2 through 7 and the bearing piles under piers 8, 9, and 10 are 12-inch 53-pound steel H-beams driven on an average of 3½-foot centers. The loading varies from 33 to 54.5 tons on each pile. Pile lengths were originally set for 40 to 60 feet, but job conditions altered



C. & E. M. Photo

This is the cofferdam for pier 8 of the new Connecticut River Bridge—just before structural-steel framework is lowered into it by floating derricks.

these requirements so that many 90-foot piles were required. At some locations 110-foot piles were deemed necessary. As the H-beams came in only 60-foot lengths, the piles were spliced together by welding on six plates. A battery of 300-amp electric welders—6 Lincoln and 6 Westinghouse—did the splicing. The two web splice plates are 6 x 12-inch, while the four flange plates, two splices to a side, measure 5 x 18-inch.

All the river piers have a tremie seal, from 8 to 10 feet deep, of plain concrete. The steel piles project through it and extend an additional 2 feet into the footing above the seal. The footings average about 64 feet long, and from 22 to 33½ feet wide. The average depth is 7 feet. Pier 8, which required the longest piles to reach rock at minus 130 elevation, has a somewhat larger footing that measures 68½ x 37 feet. On top of the footing, and stepped in a few feet, is a 12½-foot-thick distribution block that is faced with ma-

(Continued on next page)



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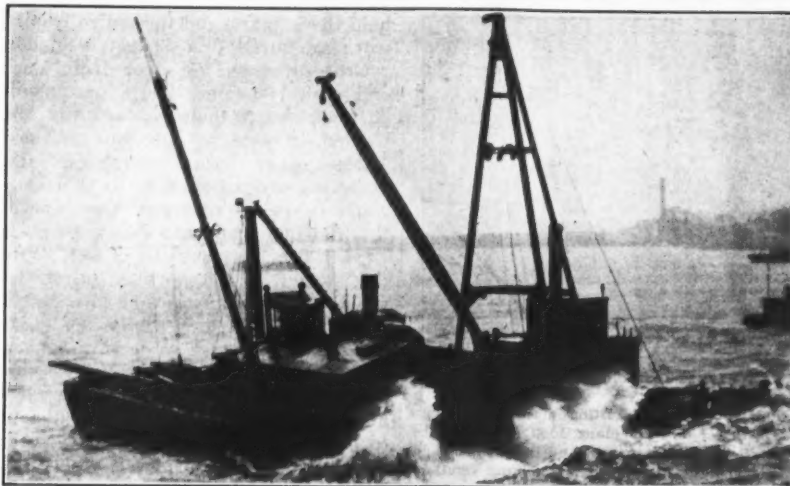
TEXACOL

sonry 10 feet high, from minus 5.0 to plus 5.0 elevation. Under piers 9 and 10 the steel bearing piles were driven to rock at elevations minus 65 and minus 46 respectively.

The twin columns in the piers increase in height gradually until at piers 8 and 9 the maximum height of 78½ feet above mean sea level is reached. This is measured to the top of the tie beam that connects all the columns at the top from piers 3 through 10. The beam is 13 feet deep.

Floating Rigs

Merritt-Chapman & Scott Corp. assembled an imposing fleet of derrick barges and scows with which to construct the river piers. Included in this floating equipment were the following wood-hull coal-burning derrick lighters: Cincinnati, measuring 110 x 40 x 10 feet, a 25-ton derrick with a 90-foot steel boom; Cleveland, of the same dimensions and capacity, but with an 80-foot steel boom; Bullion, 80 x 32 x 8 feet, an 8-ton-capacity craft with a



Winds and high waves lashed Merritt-Chapman & Scott's floating equipment during the November, 1947, storm. This picture was taken from the old lift bridge.

100-foot wood boom; and the Convoy, 100 x 40 x 8 feet, used mostly for light work, and having a 5-ton capacity with its 80-foot wood boom. The No. 47, a

derrick with a 110-foot boom, was also used in the early part of the job for driving piles.

The steel sheet piling was driven

by three McKiernan-Terry 9B3 steam hammers, while the H-beams were driven by four McKiernan-Terry 10B3 steam hammers, using a special self-centering driving head. These hammers were handled by the derrick boats for the river pier work. When they were driving piles for the other piers, they were handled by a Manitowoc Speed-crane with a 75-foot boom. This crawler crane was later set on a barge, and handled the heavy timbers used by the carpenters.

Materials and supplies were stored and carried about on seven deck scows; two dump scows were employed to carry dirt excavated from the pier sites. All this non-propelled floating equipment was towed about by three tug boats: the Chaser, a 125-hp craft which was assigned to the job; and two other diesel tugs used mainly for long material tows—the Alert, 450-hp, and the Cavalier, 300-hp. They were dispatched from the contractor's New London, Conn., headquarters, eastward along the coast 25 miles, whenever they were required.

Personnel and less bulky materials and supplies were convoyed around the job on the Chip, a 125-hp gas launch, or the Sea Mule, a former Army pontoon barge powered by twin 125-hp gas engines. The Superintendent and key personnel also had a small power boat for their use.

Material Handling

The great bulk of materials going into a job of this size required judicious handling to keep the workers supplied and the equipment occupied. Steel sheet piling, ZP 32 and ZP 38, came from the East Buffalo, N. Y., plant of Bethlehem Steel Co. and was shipped to the contractor's yard on a New Haven RR siding at New London. From there the sheeting was barged to the bridge site. Bethlehem also furnished the 12-inch 53-pound H-beams, which would have totaled over 9 miles in length if laid end to end. They were handled as was the sheeting, but were shipped from the steel company's plant at Bethlehem, Pa. Bethlehem also supplied the reinforcing steel, and shipped it in the same way from its Sparrows Point, Md., plant.

Lumber for the form work came from H. F. & A. J. Dawley, Inc., at Norwich, Conn., a 30-mile truck haul from the job. Granite for the pier facing was purchased from the quarries of the H. E. Fletcher Co. at West Chelmsford, Mass., shipped by rail to New London, and then barged to the site.

For better workability and durability of the concrete, natural cement was mixed in with the portland cement. No air entrainment was used. Snyder's Rosendale natural cement was bought in bags from the Century Cement Mfg. Co. at Binnewater, N. Y., and shipped in freight cars to the New Haven siding at Old Saybrook, Conn. Both Lehigh and North American portland cements were shipped in bags to the New York City dock of the contractor. From there a cement barge with a 10,000-bag capacity was towed up Long Island Sound to the bridge site.

Sand was also barged in from the Metropolitan Sand & Gravel Corp. at Northport, N. Y., on the north shore of Long Island. The New Haven Trap Rock Co. at Pine Orchard, Conn., supplied crushed stone for the coarse aggregate, which was delivered usually in two barges. While one was at the job, the other was in tow.

Water for the project, and to mix in the concrete, came from a 28-foot well that was dug on the Old Saybrook, or western, end of the bridge. It was pumped into a 7,000-gallon storage tank. The well also supplied a 3,000-gallon storage tank on the east side of the river. The transfer was made in tank barges, which also supplied water to the concrete batch and mixing plant.

(Continued on next page)

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(Continued from preceding page)

The waters from the Connecticut could not be used, as it is a tidal river and too near the ocean.

Within the Cofferdams

To construct the river piers, the contractor first built a temporary timber frame to serve as a template while driving the sheet piling. The frame consisted of six wood piles, about 50 feet long, which were driven at each of the four corners, with another pile at the mid-point of the long side. These were spotted carefully in place and driven from the floating rigs. They were then connected at the top with 12 x 12's. Inside this framework the ZP 32 or ZP 38 steel sheet piling, 65 feet long, was driven with the 9B3 hammers to form the cofferdam, which for piers 8 and 9 measured 70 x 40 feet. The top of the sheeting was driven to plus 10.0 elevation.

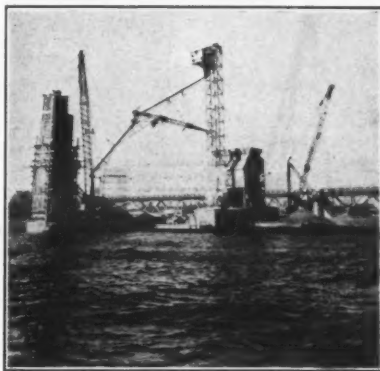
The derrick lighters with clamshell buckets then excavated to grade within the cofferdam, and also around the outside as far down as the top of the tremie seal. This was done to remove the external earth pressure from the base of the structure. The excavated material was loaded into dump scows which were towed about a mile upstream and emptied in deep water beyond the channel limits.

Then the 12-inch steel H-piles were driven with the 10B3 hammers, the outer rows battered 2 inches in 12 and the inside beams plumb. A timber checkerboard was laid over the top of the sheet piling to spot these H piles precisely, usually on 3½-foot centers. Driving was done with spud leads made from two 14-inch H-beams, 60 feet long, placed back to back.

With the steel H-beams driven, the plain-concrete tremie seal was then poured. The seal work accounted for the largest continuous pours on the project. On pier 8, for instance, the tremie concrete totaled 600 yards. And, since it was monolith construction, 24 hours were required for its completion. With this initial concrete in place, the temporary timber frame was then removed from the outside of the cofferdam.

Internal Bracing

In the meantime, structural-steel frameworks for the internal bracing of the cofferdams were assembled on the deck barges. After the seal pour, two of the floating derricks, one on each end, lifted this heavy framework from the barge and placed it within the sheet-pile cofferdam. At pier 9, where the bottom of the tremie seal went down to elevation minus 45.0, three different levels of steel rangers comprised the framework at minus 18, minus 6, and plus 2 elevations. For the other piers, which were less deep, two levels of frames sufficed. At pier 8 the



C. & E. M. Photo

This is how Merritt-Chapman & Scott's floating concrete plant looked from a small boat bobbing up and down in the Connecticut River—with a ground swell rolling in from Long Island Sound.

bottom frame at minus 15 consisted of a rectangular ring of 14-inch 73-pound H-beams, while the top frame at plus 2, 17 feet above, was made up of 12-inch 53-pound H-beams. Vertical beam posts

held them apart, and the entire framework measured 70 x 39 feet 10 inches.

Cross-bracing, 7½ feet from each end with H-beams, was a permanent part of the framework as was the welded bracing at the four corners. Three other cross members, also H-beams, were bolted in so that they could be easily removed. One was at the mid-point, and the other two were 13 feet 3 inches from the center. With the framework supporting the sheeting, the cofferdam was then unwatered, and the top of the tremie seal was thoroughly cleaned so as to make a good bond with the rest of the concrete. A couple of Jaeger pumps, a 6 and an 8-inch, were usually sufficient to pump out the cofferdam.

Referring again to pier 8, where the bottom of the 10-foot tremie seal is at elevation minus 40, the next step was to complete the concrete-block pour from minus 30 up to minus 20. Up to this level the concrete was placed against the sheeting with no forms required. The distribution block was

poured next from minus 20 to minus 7.5 elevation. It required forms, since it stepped in 5 feet 3 inches from the footing. The frame at minus 15 naturally was in the way of the rising concrete, so the wales were elevated to minus 10, and finally removed altogether as the pier was gradually built up. The upper frame was also taken out, while the forms were braced with timber chocks wedged between the forms and the sheeting. The piers were then completed the rest of the way to the top. The same procedure, in general, was followed for all the river piers.

No wooden forms were necessary where the 10-foot-high strip of masonry encased the piers from minus 5.0 to plus 5.0 elevation. The stone facing varies in thickness from 1 foot 3 inches to 1 foot 9 inches, and was tied to the concrete that was being placed within by 1-inch anchor rods, 2 feet 1 inch long. This part of the pier was poured in two lifts, first a 6-foot then a 4-foot lift of concrete. The rest of the

(Continued on next page)

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pier pours were in 20-foot-high sections, but the cross beams at the top, like the tremie seal and footing pours, were done as monoliths.

The wood forms were made up in panels 20 feet high and running the full dimensions of the piers. They consisted of 1 1/4-inch lumber faced with 1/2-inch plywood, backed by 3 x 6 studs on 2-foot centers, and with double 3 x 6 wales on 2 1/2-foot centers. Richmond ties, 3/4 and 1-inch size, were placed at from 2 to 3-foot spacing both ways to hold the forms together. This form design and construction held true to line and grade during all pours without incident. But a violent wind that struck the job with gale force on November 8 of last year bowled over the forms for one of the columns on pier 5. The storm came at night so no injuries resulted from any one being caught on the pier.

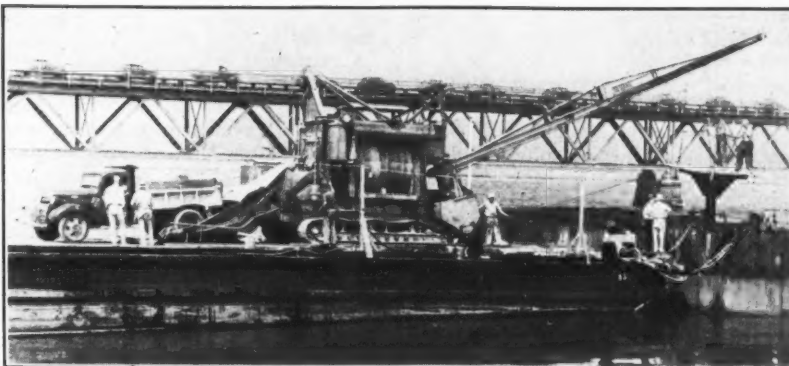
Concrete Plant

All the river piers were poured from a floating concrete plant, the same that had last been used when Merritt-Chapman & Scott Corp. had constructed the substructure for the new Mississippi River bridge at Memphis, Tenn. Converted from a car float, the all-steel mixing barge is 180 feet long, has a 40-foot boom, and draws 6 feet of water. From Memphis it was towed downstream to Louisiana and then through the Intracoastal waterway, and on up the Atlantic coast to the Connecticut River.

The plant is equipped with a Blaw-Knox 105-ton 3-compartment aggregate bin which held sand, 1/2-inch, and 1 1/4-inch crushed stone. The aggregate was unloaded from the supply barges, which were moored alongside, with a 2-yard clamshell bucket. The bucket was swung from the 75-foot boom on the derrick located at the opposite end of the barge from the aggregate bin. The bins discharge into two Smith 1-yard mixers located on the level below. Bag cement is hoisted to the mixers by an elevator and dumped into the drums by hand.

Power for the barge is supplied by two oil-fired boilers, a horizontal type of 100-hp capacity, and a vertical 70-hp unit. The plant carries 27,000 gallons of water in its hull. A Lambert hoist operates the derrick. A Sure-Lite 25-kva generator supplies electric power and light for night operations. The craft is also equipped with both electric and steam pumps; water is pumped aboard from the tank barges.

When concrete was being mixed for a pier pour, the floating plant was held at the upstream side of the particular site by three lines fastened to the existing bridge, with three other lines running out to anchors downstream. The mixers, both of which were operated at the same time, discharged into a 1-yard bucket placed at the base of a 100-foot tower. When filled, the bucket of concrete was hoisted to the top of the tower and discharged into a hopper which emptied into a chute. The chute sloped



A MultiFoote 34-E Duomix paver works on a tremie-seal pour for pier 4 of the new Connecticut River Bridge between Old Lyme and Old Saybrook. It is spotted on a deck scow at the end of a floating construction bridge which extends out from shore, passing through the columns of pier 3.

downward at a 45-degree angle, and was held in place by a stationary boom fastened to the tower.

For a tremie-seal pour the concrete went from the chute to a tremie hopper, and then through pipes to the bottom of the pier. As the pier climbed upwards

the concrete could be discharged from the chute directly into the forms. On the high pours the Manitowoc Speed-crane with a 75-foot boom was floated to the site on a barge to handle a 1-yard bottom-dump concrete bucket. The bucket caught the concrete as it slid

down the chute, and was then swung over the forms and emptied. Mall vibrators vibrated the concrete as it was placed. The plant usually was operated at a capacity of from 40 to 50 cubic yards of concrete per hour.

Winter Operation

During cold-weather pours the sand and stone were heated by passing a series of 1-inch steam pipes through the bins, the steam being supplied by the plant's boilers. The pipes were outfitted with jets which sprayed the live steam through the bins. Each of the bins had four such steam lines.

The mixing water was also heated by passing it through a 12-foot length of 10-inch cast-iron pipe before it was admitted to the drums. Through this pipe ran a coil of smaller-size pipe containing live steam which heated the water. The steam was in constant circulation from the boiler.

In warm weather the concrete was cured only with water. In winter opera-

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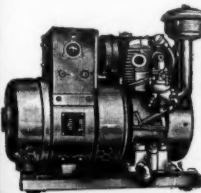
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High-Level Bridge Replaces Lift Span

(Continued from preceding page)

tions the piers were covered with tarpaulins that draped over the walls, leaving an air space of 6 to 12 inches between the canvas and the concrete. Steam was admitted to this area; it served the double purpose of preventing the concrete from freezing, and also curing it with the moist spray.

The mix employed one bag of natural for six bags of portland cement, with two sizes of crushed stone and one grade of sand. An average of 35 gallons of water was added to each batch. The tremie-seal pour differed slightly from the concrete in the rest of the pier. Dry weights of a typical batch of each kind were as follows:

	Tremie-Seal Concrete	Dry-Pour Concrete
Cement	658 lbs.	658 lbs.
Sand	1,214 lbs.	1,326 lbs.
1/2-inch stone	715 lbs.	787 lbs.
1 1/4-inch stone	1,329 lbs.	1,461 lbs.

Quantities and Personnel

The major items contained in the substructure contract were as follows:

Bridge excavation	14,000 cu. yds.
Reinforcing steel	550,000 lbs.
Concrete	22,500 cu. yds.
Steel H-piles	3,500,000 lbs.

Merritt-Chapman & Scott Corp. was represented on the Connecticut River bridge project by Harold Jenkins, Superintendent, and A. M. Heaton, Resident Manager. From 120 to 150 men were employed on the substructure.

For the Connecticut State Highway Department, Colonel Howard S. Ives is Project Engineer, assisted by Edward J. Gray and Elton E. Buck. The Department is headed by G. A. Hill, State Highway Commissioner, with R. E. Jorgensen, Deputy Commissioner and Chief Engineer. Warren M. Creamer is Director of Engineering and Construction, with M. A. Tyack, Engineer of Contracts and Construction.

Other Contracts

Besides the steel superstructure and its 12-foot-high girders, which is under a separate contract to the American Bridge Co., the project also includes contracts for the east and west approaches. Other contracts will also be awarded for paving, toll facilities, lighting approaches, removal of the old bridge, and for a grade structure overpassing Lyme Street, and connecting

with a relocated section of U. S. 1 on the Old Lyme side.

The approach on the west or Old Saybrook side is being constructed by the M. A. Gammino Construction Co. of Providence, R. I., under a \$338,588 contract. This job includes chiefly grading and drainage on the 3,427-foot approach, and also a 76-foot single-span bridge carrying U. S. 1 over State Route 80. In addition to 65,000 yards of excavation, the earth work included 363,000 yards of borrow which was obtained from pits within 1/2-mile radius of the job site.

On the east or Old Lyme approach, which is 4,444 feet long, the Campanella & Cardi Construction Co. of Providence, R. I., held a \$498,415 contract for grading and drainage, and the construction of two bridges. On this end the excavation was 57,000 yards, while the borrow was 240,000 yards. One bridge carries U. S. 1 over State Route 156 on a 3-span I-beam structure 128 feet long. The other, also on U. S. 1, crosses the Lieutenant River on a

3-span structure, 190 feet long, and supported on steel piles.

A feature of this east-approach contract was a marsh, 25 to 30 feet deep, over which the new fill had to be placed. In order to avoid the costly excavation of this layer of muck, and yet place the fill at once, the marsh was drained with sand wells. The wells were 12 inches in diameter and 38 feet deep, dug on 15-foot centers both ways over the area of undesirable material. About 400 holes were first dug by a Highway Department crew with a hydraulic auger, and then backfilled with sand. As the backfilling was done at once, the pipe used in drilling the hole was removed without the muck filling the opening. The water in this marsh then found an outlet through the sand wells.

This work of draining the 1,000-foot-long marsh was done by the Highway Department crew and equipment, and reduced the cost of making the fill. It also permitted the fill to settle much more rapidly than would have been the

case if the ordinary process of settlement had been in effect.

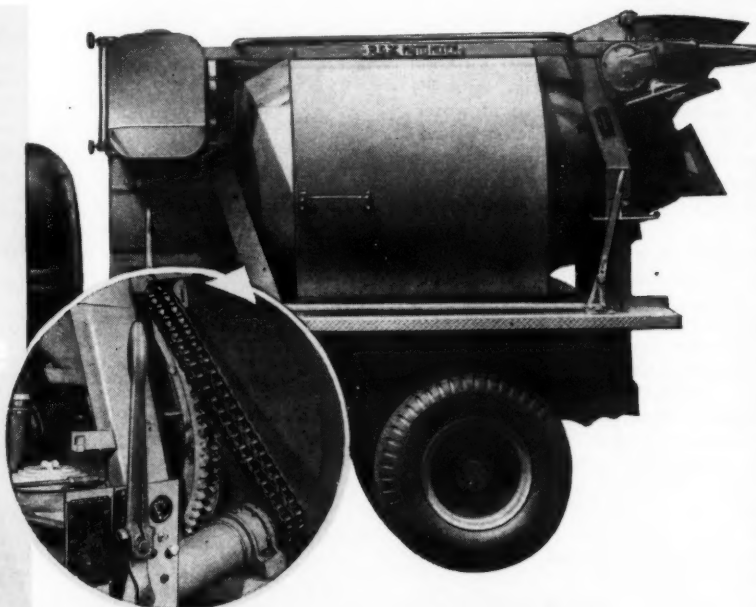
Concrete-Handling Tools

A broadside which lists and describes its complete line of equipment is available from the Master Vibrator Co., P. O. Box 657, Dayton 1, Ohio. This equipment includes concrete vibrators and hand tools for use with them, grinding machines, vibratory finishing screeds, concrete-floor finishing machines, electric hammers, hammer tools, spade attachments, backfill tampers, gas-electric generator plants, and general-purpose floodlights.

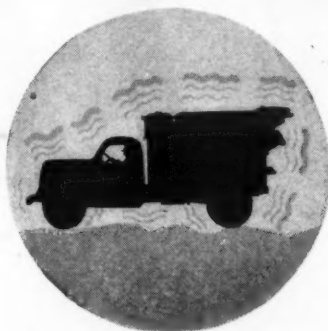
Form MV 872 tells what each of these tools is, the uses to which it can be put, its outstanding features, its power requirements, and the capacities in which it is available. Pictures are used to illustrate the tools, as well as to show them in use.

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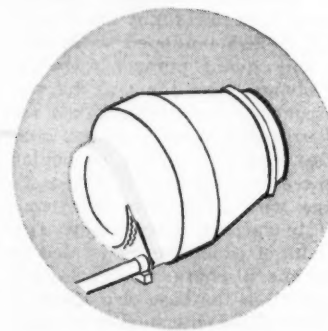
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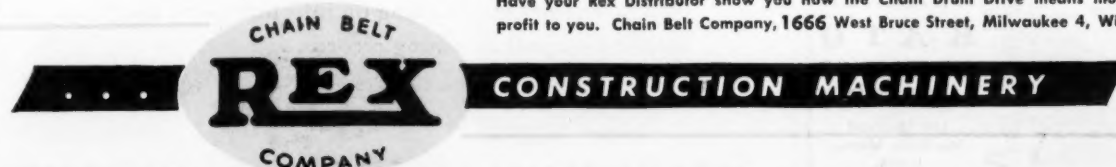


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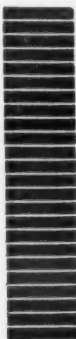
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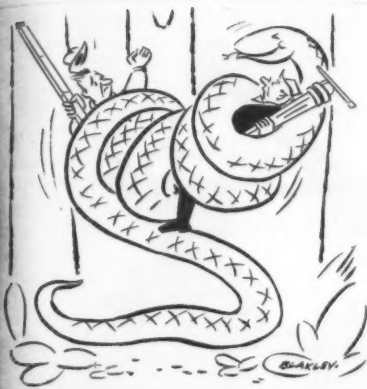
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The TD-18 engine has a new cylinder head, manifold, fuel system, and a compression ratio of 15½ to 1. Intake and exhaust manifolds are mounted on opposite sides of the engine to provide a direct flow of intake air and exhaust gases. The injection pump has two plungers, each serving three cylinders. The injection nozzles are of the single-orifice type, with pre-combustion chambers.

The TD-14 has a redesigned cylinder head, intake and exhaust manifolds mounted on opposite sides of the engine, and a compression ratio of 15½ to 1. The injection pump has a single plunger, and fuel is injected through a single-orifice injection nozzle.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 105.

Weld-Cleaning Hammer

Hammers for cleaning welds are made by the Industrial Products Co., 2914 N. 4th St., Philadelphia 33, Pa. The all-metal Scalemaster hammers are made in two styles: Model No. 100, and Model No. 300. They are properly balanced, the manufacturer points out, and have no parts to come loose. The Model No. 100 has a brush mounted at an angle to prevent bruised or cut knuckles. The brush is held by steel springs, and is reversible and replaceable.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

New Holland Appointments

Two District Managers have been appointed by the New Holland Mfg. Co., Mountville, Pa., a division of the New Holland Machine Co. This company makes a line of crushing-plant equipment. Keith B. Hubbard has been assigned the New York State and New

England territory. The Western District has been turned over to A. E. Ainlay. This territory includes California, Oregon, Washington, Montana, Wyoming, Utah, and Colorado.

Equipment Trailers

A line of trailers for hauling construction equipment is made by the Alfred Stauffer Machine Shops, Honey Brook, Pa. The Stauffer trailers come in two models with 6 and 10-ton capacities. Feature of the trailers is the fact that their platforms are 14 inches above the ground, which is said to simplify loading and to reduce overhead clearances required while in transit. According to the manufacturer, 40 per cent of the load is carried by the towing vehicle, and 60 per cent is on the trailer's wheels.

The Model No. 6-A trailer has two 7.50:18 14-ply tires, is 96 inches wide, and 18 feet long. Its platform bed is 76 inches wide, and 14 feet long. Clearance under the frame is 9 inches. The



A Stauffer equipment trailer towed by a Dodge truck carries an International TD-6 tractor. The trailers come in two models with 6 and 10-ton capacities.

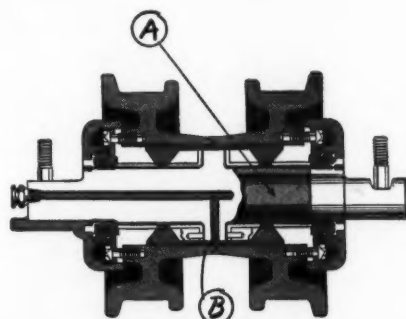
Model No. 10-A has four wheels mounted on two tandem axles, and is 76 inches wide and 16 feet long inside the bed. Stauffer trailers are sold complete with either air or vacuum brakes,

necessary lights and turn signals, bumper, and loading rail.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 102.



CASE 1024--MAINTAINING LUBRICATING FILM ON TRACTOR TRACK-ROLLER BEARINGS.



CATERPILLAR TRACK ROLLER BEARING

When track-roller bearings in a Caterpillar doing heavy-duty dirt moving were lubricated regularly with RPM Tractor Roller Lubricant, their service lives were noticeably extended. Efficient in all climates. To meet various conditions, it comes in three grades: Light, Medium and Heavy.

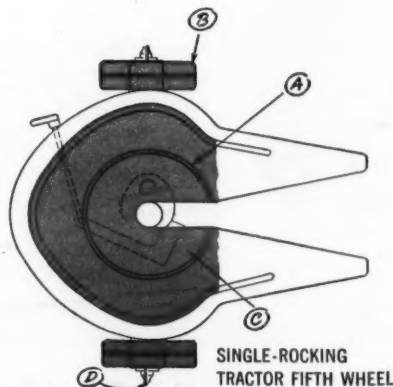
A. Contains a highly effective chemical anti-wear agent.

B. Has new stringiness agent--resists extreme pressure and constantly changing shock loads, controls flow of lubricant through bearings and keeps film on bearing surfaces.

RPM Tractor Roller Lubricant is resistant to water and helps seals keep out grit and dust.

A special kind of this outstanding product, RPM Tractor Roller Lubricant A.C. Type is made for Allis-Chalmers tractors.

CASE 1028--MAINTAINING LUBRICATING FILM ON CHASSIS BEARINGS UNDER EXTREME PRESSURES.



SINGLE-ROCKING TRACTOR FIFTH WHEEL

In the severest truck and bus service RPM Chassis Grease TB stayed on bearings longer than usual period between grease jobs. Improved product made specially for heavy-duty service. Has distinctive gray color. Comes in three grades: Light, Medium, Heavy.

A. Contains metallic anti-wear ingredient - resists wear and prolongs bearing life.

B. Cushions bearings against shock loads ... improved stringiness additive keeps film on surfaces - provides high adhesion and cohesion properties.

C. Heavy oil stock assures tough lubricant film - minimizes galling on large bearing surfaces.

D. Has excellent pumpability in cold weather - Light grade pumps freely in temperatures down to minus 10°F.

RPM Chassis Grease TB is waterproofed, keeps protective collar at outside edge of shackle bearings.

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New Airport Is Built For Industrial City

Site Graded; Two Landing Strips and Access Road Have Gravel Base; State, City, and CAA Participate

THE city of Fall River, located in southeastern Massachusetts on the left bank of the Taunton River, now has a new Class 2 airport under construction, as part of a civic program to hold or to attract diversified industry. This city of 115,428 population is the first in its part of the country to start airport construction under the Federal Airport Act. The Act enables the Federal Government to assist municipalities in airport construction by granting to the municipality up to 50 per cent of the allowable project costs. In Massachusetts, the municipality contributes 25 per cent, the Commonwealth 25 per cent, and the Federal Government 50 per cent.

The new field is located 5 miles north of downtown Fall River, and about 1/4 mile east of North Main Street. Grading began on the project last autumn, and was largely completed before winter closed in and suspended operations. This season the grading was completed along with the gravel work.

The gravel runways will be paved with bituminous concrete at a later date. One landing strip is 3,700 feet long x 400 feet wide; the other is 1,800 feet long x 300 feet wide. The short runway is to be extended to at least 3,500 feet at some future time.

Dooley Brothers, Inc., of Roxbury, Mass., was awarded a contract for the construction of the new airport on September 16, 1947. Its low bid to the Fall River Airport Commission was \$187,290. The work included grading, the two landing strips, a 2,300 x 50-foot taxiway, and an access road 1,300 feet long to connect the airport with North Main Street. The job was scheduled to be completed by this summer.

Grading

An old, abandoned farming area was chosen for the airport site, with a somewhat rolling topography and some thickly wooded sections. The size of some of the bigger trees, oaks and maples, ranged up to 36-inch diameter, but three Mall power chain saws made short work of them. A Byers 82 crane with a 35-foot boom and a 3/4-yard clamshell bucket lifted out the stumps which were burned, while the rest of the trees were hauled away to a lumber yard. The small-size trees were pushed over with dozers, of which there were a total of nine on the job—two International TD-18's and seven Caterpillars, two D8's and five D7's.

The soil was glacial till mixed with a good supply of boulders. A Lorain 1 1/2-yard shovel picked these up and loaded them into four contractor-owned Sterling 6-yard trucks. Three smaller 4-yard trucks were hired by the hour to assist with these operations. The shovel and trucks also moved the small amount of rock on the job. Holes were

drilled in the ledge and in some of the larger boulders with a Worthington jackhammer powered by a Worthington 105-cfm air compressor. Blasting was done with 40 per cent dynamite. The compressor also came in handy during the grubbing operations in the autumn, when the leaves became pocketed between the radiator and the radiator guards on the tractors. An air hose hooked up to the compressor quickly cleared out the leaves and muck.

A LeTourneau heavy-duty Rooter had been brought to the job to loosen up the soil for the earth-moving equipment, but it seldom had to be used. Nearly all the dirt was moved either by self-propelled or tractor-drawn scrapers. For the short hauls, six LeTourneau Model W scrapers, holding



C. & E. M. Photo

A Lorain 1 1/2-yard shovel loads a Sterling truck with 6 yards of material during grading of the Fall River Airport, located 5 miles north of Fall River, Mass.

from 18 to 23 cubic yards, were hooked up with D8 tractors. A D7 push tractor

helped in the loading, and the haul (Continued on next page)

HOW TO MAKE YOUR BUDGET DOLLAR GO FARTHER

HUBER MAINTAINER
A versatile machine that also serves as a bulldozer, lift-loader, patch roller, snow-plow, or rotary broom.

HUBER 3-WHEEL ROLLERS
Automotive type, built in sizes from 5 to 12 tons. A fast, economical and powerful machine.

HUBER TANDEM ROLLERS
Variable weight offering maximum maneuverability. Built in sizes from 3 to 12 tons.

The answer is simple. All you need is Huber Road Machinery with its reputation for speedy operation . . . plenty of power and stamina . . . maximum time and money saving economy . . . dependable performance . . . long life service. Drop in and see your nearest Huber distributor. Let him show you why Huber Road Machinery should be working for you. Let him tell you about the many important features built into these fast machines. If you would, your next road machinery will be Huber.

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ROAD ROLLERS
and
MAINTAINERS

averaged about 600 feet. On the longer hauls, averaging 1,200 feet, four Super C Tournapulls with Model LP scrapers, holding from 10 to 12 yards, were in use. These units were snatch-loaded in front by a D8 tractor.

Along with the grading operations, the scrapers stripped off the topsoil to a depth of 6 to 18 inches. This material was stockpiled for use later on the runway shoulders.

Compaction

The cuts and fills balanced out nicely so that there was neither waste nor borrow with the earth work. Dozers spread the material for the fills in 8-inch lifts, and a Galion 102 motor grader shaped it. The specifications required that fills be compacted to not less than 90 per cent of the maximum density at optimum moisture, as determined by compaction control tests. Under all paving this maximum was increased to 95 per cent, and was carried down to a depth of 9 inches below the surface of the subgrade.

When necessary, the lifts were wet down with water sprayed from an Etnyre 1,270-gallon distributor using a 10-foot spray bar. The water was obtained from fire hydrants along North Main Street, ¼ mile from the job. During the dry weather last autumn, about 2 gallons of water was added per square yard of a lift of fill to obtain the optimum moisture content. Compaction was achieved both by the heavy equipment running over the embankment, and by the use of a Bros rubber-tire roller pulled by a truck. The compaction tests ran closer to 100 than 90 or 95 per cent.

The amount of dirt moved in a week of six 8-hour days started off with around 6,000 to 7,000 yards, and then gradually increased to about 10,000 yards weekly average.

Drainage and Gravel Base

In cuts, drainage ditches were dug 250 feet off the center line of the landing strips, with the ditch line 2 feet below the edge of the shoulders. In addition to the open-ditch drainage, water is carried off in reinforced-concrete pipe from 12 to 36 inches in diameter, with the flow towards the south end of the field. The drainage is into a natural valley which empties into the Taunton River. Ditching was done by a Northwest Model 25 Pullshovel with a ¾-yard bucket. The Rhode Island Concrete Pipe Co. of Providence, R. I., furnished the pipe.

Sub-base for the landing strips consists of a layer of gravel from 10 to 14 inches thick. Over most of the area 10 inches sufficed, but this was increased to 14 inches under the final 250 feet of runway and under all the taxiway. The material was obtained from two pits along the river with hauls averaging ½ and 1½ miles from the job. Two 1½-yard shovels—a Northwest and a Lorain—were put in the pits, and a fleet of 14 trucks, both contractor-owned and rented, hauled the material. Dozers and grader spread the gravel in 6-inch lifts which were then rolled by a 10-ton 3-wheel roller.

Over the sub-base went a layer of finer gravel for the 8-inch base course. The sub-base gravel had to be kept under a maximum 3-inch size, but for the base course the maximum was reduced to 2-inch. The gradation for the base course also had to conform to the following specifications:

Sieve Size	Per Cent Passing
2-inch	100
1-inch	55-85
¾-inch	50-80
No. 4	30-60
No. 40	10-30
No. 200	3-10

All the gravel was taken from the same two pits, but that for the base course was first screened over a 2-inch sieve. The base-course gravel was spread in 2½ to 4-inch lifts, then shaped and rolled. The 18-foot-wide access road

also has gravel for the sub-base and base course, each of which is 6 inches thick; the base course was given an oil treatment. The access road ends at the airport in a 250-foot square parking area, also built of gravel. A temporary administration building will be built just off the parking field.

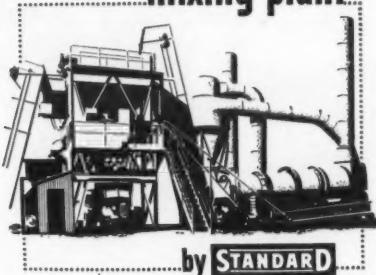
Bituminous Pavement

A cross section of the 400-foot landing strip, when it is completed, will show a 150-foot paved runway down the center, with a pitch of 1 per cent each way from the center line. To prevent raveling at the edges, the gravel base course was laid 151 feet in width. From the pavement, 125-foot shoulders will drop off on a 1.5 per cent slope. The shoulders will be covered with 2 inches of topsoil. The initial 50-foot taxiway is sloped 1 per cent from the center line, and has 25-foot shoulders on a 1.5 per cent slope.

The longer runway strip is in a southwest-northeast direction and has room to the northeast, for a possible

(Concluded on next page)

Black-top mixing plant



STANDARD is one of the oldest and largest builders of paving plants—seven sizes to meet all conditions. Used throughout the world. Modern, Unit-built, easy to erect and transport.

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MORE HEAPING LOADS PER HOUR—PER SHIFT MEAN GREATER PROFITS PER JOB



WITH
WOOLDRIDGE
200 H. P.
TERRA-COBRA

FASTER LOADING of larger heaping loads, trip after trip with less down-time; faster hauling, spreading and dumping, plus faster return trips with Wooldridge Terra-Cobras; add up to higher total yardages moved, at lower cost and greater profit. That's why more and more contractors are turning to Wooldridge Terra-Cobras and Wooldridge earthmoving equipment. Wooldridge Terra-Cobra is built to move more dirt, even on the toughest jobs. The many proved features of the Terra-Cobra such as two wheel steering, Universal oscillating pivot, independent three line cable control have revolutionized self propelled high speed earthmoving operations. Get full details today and bid your jobs on Terra-Cobra's productive performance.

See the 200 H. P.

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TERRA COBRA

AT THE ROAD SHOW

JULY 16-24

WOOLDRIDGE MFG. CO.

SUNNYVALE CALIFORNIA, U.S.A.

ALSO FEATURED AT THE ROAD SHOW

The Complete line of Wooldridge Equipment

GET THE MOST OUT OF YOUR JOBS WITH WOOLDRIDGE EQUIPMENT



SCRAPERS



BULLDOZERS



RIPPERS



POWER CONTROL UNITS



TRAILBUILDERS



C. & E. M. Photos
The picture above, of grading operations at Fall River Municipal Airport, shows a D8 tractor snatch-loading a Super C Tournapull with an LP Carryall holding from 10 to 12 yards of dirt. In the other photo, from left to right, are Resident Engineer Sanford S. Mitchell; Treasurer of the contracting firm Albert P. Dooley; James F. Byrne, Chief Airport Engineer, Massachusetts Aeronautics Commission; and President Tom Dooley.



New Airport Is Built For Industrial City

(Continued from preceding page)

ultimate length of 4,500 feet, if future traffic demands require such expansion. It is crossed by the other shorter northwest-southeast runway, and enough space is available to the southeast to increase its length to 4,500 also, if the occasion arises. The initial taxiway which is separated from the southwest-northeast runway by 175 feet of seeded area may also be lengthened if necessary. Space is available for adding a taxiway to the other runway.

Quantities and Personnel

The major items in the Fall River first-stage airport contract include the following:

Excavation	240,000 cu. yds.
Reinforced-concrete pipe, 12 to 36-in.	1,635 lin. ft.
Aggregate base course	60,000 cu. yds.

For Dooley Brothers, Inc., John Scheuren is Superintendent. Tom Dooley, President of the firm, and his brother Albert, Treasurer, also give the work their close supervision. Tom, in fact, bought a horse so that he could get around the large area in all kinds of weather without difficulty. He is an old hand with horses, having worked with them as a boy in his father's contracting business.

The design for the airport was drawn up by Fay, Spofford & Thorndike, Engineers, of Boston, Mass. Sanford S. Mitchell of that firm is Resident Engineer on the project, and Elmer Dana is Field Engineer. General supervision is also exercised by the Massachusetts Aeronautics Commission of which James F. Byrne is Chief Airport Engineer. Leo V. Gaffney is Chairman of the Fall River Airport Commission, the initiator of the project.

Rock-Boring-Machine Data

A folder describing the McCarthy rock-boring machine has been made available by The Salem Tool Co. of Salem, Ohio. The machine is made in horizontal and vertical types, and the folder covers each of these in detail.

The folder lists the features claimed for the machine, describing fully its engine, transmission, carriage, hydraulic unit, elevating jacks, and self-propelling unit. Photographs show the machine in use on rock-boring jobs under various conditions.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 67.

Goodyear Advances Miller

Charles B. Miller has been appointed District Sales Manager of the Goodyear Tire & Rubber Co.'s Mechanical Goods Division at Chicago. This district covers Illinois, Wisconsin, and southern Indiana. Miller succeeds Guy E. McMahon, who will remain in Chicago as Special Representative for Goodyear's

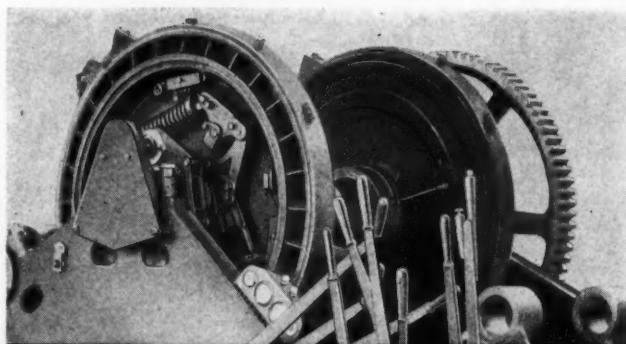
industrial rubber products. William F. Burdick succeeds Mr. Miller as Field Representative for the Mechanical Goods Division in the Akron area.

Allis-Chalmers Export Mgr.

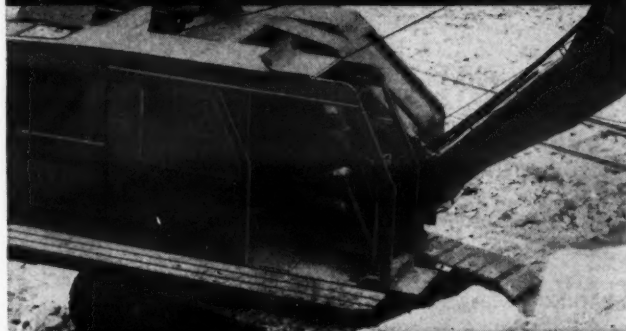
M. J. Proud has been named Manager of the Tractor Division Export Depart-

ment by the Allis-Chalmers Mfg. Co. He succeeds W. O. Taylor who retired after 42 years of service. Mr. Proud has been with the company since 1935.

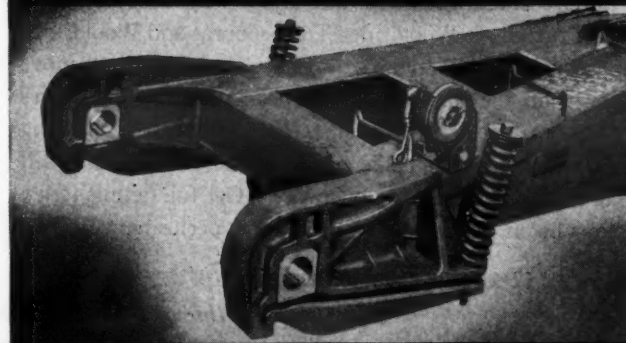
KOEHRING 605 Output Per Shift



Engine power does the heavy work, supplies 90% of the effort when operator sets these main drum clutches on the Koehring 605.



Light lever pull, 7 lbs. average, eliminates operator fatigue. No costly production letdown at shift end.



Two coil-spring shock absorbers, one on each side of boom-foot, cushion out shocks and stresses of rock handling.

1 New Exclusive Power Clutch Steps Up Operator Efficiency

Top production all day long, because the Koehring 605 is easy on the operator. No physical fatigue, because heavy hand-lever pull is eliminated. Engaging the Koehring 605 Power Clutch, takes only 1/10 the lever pull required to set a manual clutch of similar size. Lever pull is rarely more than 7 lbs. No nervous fatigue, because "Feel of Load" has been retained. Clutch is completely responsive.

2 Boom Foot Shock Absorbers Step Up Rock Digging Output

Coil-spring shock absorbers, one on each side of boom foot, protect the Koehring 605 against boom strains and sudden loads. This not only insures against boom troubles and delays, but also speeds up entire digging cycle. With the 605, your operator can use full speed up through the bank without fear of catching a ledge or niggerhead on the corner... can use full throttle on the swing, brake sharply over the truck, letting the shock absorber take care of "whip" action.

See your Koehring Distributor for more information on the 605.



With entire shovel shock-absorber protected, it's safe to handle big dipper loads like this. No danger of boom trouble here.

KOEHRING COMPANY Milwaukee 10, Wis

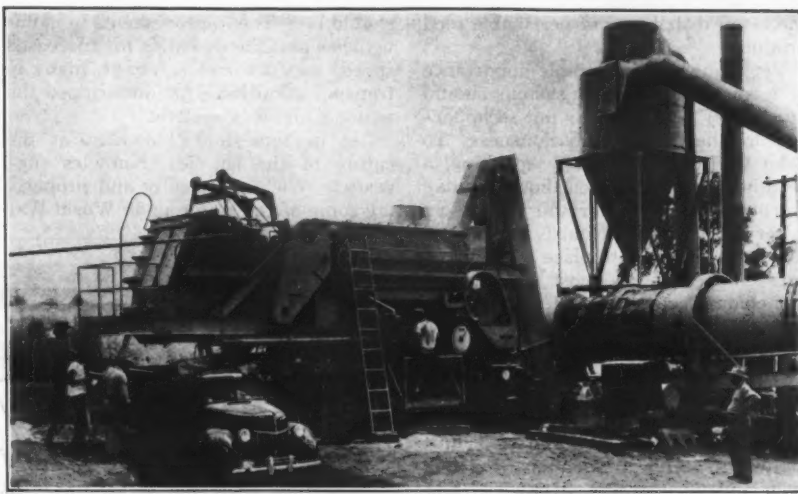
Subsidiaries: JOHNSON • KEWICK-MIX • PARSONS

Bituminous Plants Meet Several Needs

Three new models of bituminous-mixing plants have been announced by the Iowa Mfg. Co., 116 N. 16th St., Cedar Rapids, Iowa. The Model FA is a 25-cubic-foot batch-type plant; the Model A is a 1,000-pound stack-up type of plant; and the Cedarapids Patchmaster is a portable plant with a rated capacity of from 20 to 30 tons of mix per hour.

The Model FA features centralized controls within easy reach of the operator. The pugmill gate, bitumen bucket, aggregate batcher, bin gates, dust elevator, and dust screw are all air-actuated. The air-actuated pugmill gate is said to permit using the plant for cold-mix jobs, as steam is not required for plant controls. A lime batcher and a naphtha batcher have been made available as accessory items.

The Model A is designed for permanent installation, but consists of standard Cedarapids units and can be dismantled and moved if necessary. Gra-



One of three new-model Cedarapids bituminous mixing plants, the Model FA is a 25-cubic-foot batch-type plant which features centralized air-actuated controls.

dation of aggregate is assured by a Cedarapids-Symons horizontal vibrating screen. Batchers weigh and propor-

tion the amount of aggregate and bitumen for each batch. The twin-type steam-jacketed pugmill carries the en-

tire batch below the center line of the shafts for thorough mixing and power economy. An automatic time lock, available as optional equipment, is used to predetermine the time for dry-mix and wet-mix in the pugmill. It automatically locks the discharge gates of the batcher and pugmill so that material is not released until the pugmill has discharged the previous batch. A signal horn tells the operator when each phase of the time cycle has been completed. The Model A requires from 65 to 75 hp, which can be furnished by either gasoline, diesel, or electric power.

The Patchmaster is a portable continuous-mix-type unit, with aggregate and bitumen proportioned by volume. It has a capacity of from 20 to 30 tons per hour. Specially suited for use on small jobs in out-of-the-way places, it is mounted on pneumatic tires for easy portability. All operating controls are accessible from the operator's platform. The single-shaft pugmill has replaceable paddles, paddle tips, and liners. A manually operated shut-off valve controls the flow of mixed material to the loading truck. A gage is provided for measuring the volume of bitumens supplied by an asphalt metering pump. A Cedarapids drier is designed for use with this outfit when aggregates are to be heated for a hot-mix.

A 36-page catalog describing Cedarapids batch-type bituminous-mixing plants has been made available by the company. It describes in detail the standard equipment that makes up these plants, and the accessories available for use with them. It also contains a 2-page discussion on the advantages of using batch-type plants for bituminous mixes. A description of the flow of material and sequence of operations in batch-type plants is included. A glossary of terms used in the bituminous-construction field will also be found in the catalog.

Further information, or copies of Bulletin No. AP-12, can be secured from the company. Or use the enclosed Request Card. Circle No. 100.

Saw Has Spiral Blade

A band saw with a spiral blade is announced by the Tyler Mfg. Co., Inc., Santa Monica, Calif. The spiral blade is designed to cut from all sides, utilizing the full 360 degrees of its surface. According to the manufacturer, the 12-inch Tyler band saw will handle all types of hard or soft wood, soft metals, or non-ferrous metals, plastics, rubber, etc.—and can be used to cut in any direction. The depth of the saw throat does not limit the thickness of the material which can be cut, the company points out.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 14.

Resistance-Welding Data

Resistance-welding equipment can be used to form long reinforcing bars in order to yield a continuous piece of steel and thus eliminate lapping and splicing; it can be used to form large templates used in making caissons; and it has other applications in the construction industry. Equipment of this type is made by The Federal Machine & Welder Co., 212 Dana St., Warren, Ohio, and literature on it is available.

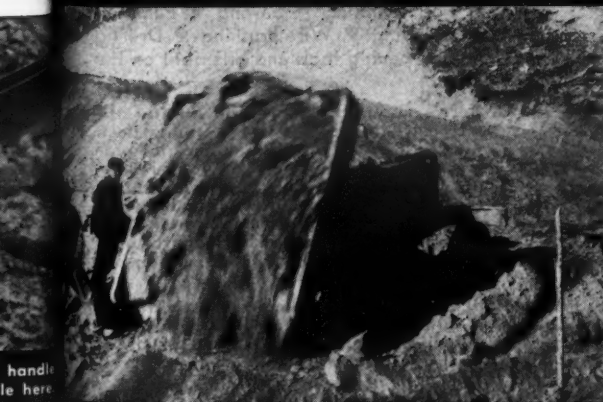
This literature describes the several types of resistance welding and the equipment they call for. Separate catalogs cover gun-type welders, spot and projection welders, flash welders, seam welders, and others. The bulletins describe each of these in detail, list the uses to which each can be put, and give complete specifications on the sizes and styles in which each can be obtained.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

605 SHOVEL Stepped Up 2 Ways



KOEHRING DUMPTOR: A Hauling Unit Built by a Shovel Manufacturer



Gravity Dump . . . No Body Hoist: Touch release lever and gravity fills scoop shaped body instantaneously. Always dumps fast and clean. No



High Speed . . . Reverse or Forward: No slow turns shutting from shovel to dump. Dumpton travels as fast in reverse as forward. Eliminates time wasted turning, cranks, spalling

The Case for Speeding The Road Program Now

Our National Security and Economy Depend on a Good Highway System: The First Step in Getting It Is to Tell John Q. Public the Facts

THE nation's highways are the blood streams of its commerce and industry. They are as essential to a sound and healthy body-politic as a sound circulatory system is to the human body, and nothing should be permitted to hamper their continued and accelerated construction, improvement, and maintenance. This is the conviction which was expressed in a paper presented at the Purdue Road School last February by Burt L. Knowles, Engineer Advisor of the Associated General Contractors.

In developing his analogy, Mr. Knowles pointed out first that highways are also the blood stream of the nation's defense in time of war and in time of troubled peace. Hitler's early military success, he reminded his listeners, was largely attributed by military authorities to the excellent highways he had built as a part of his program of preparation for conflict. And his troops suffered immediately from the lack of good highway transportation when they were operating on foreign soil over inadequate roads.

Roads and Our Economy

There is little need, said Mr. Knowles, to elaborate on the importance of good roads to the nation's economy in both wartime and peacetime. It should be especially apparent, perhaps, to those living in rural or semi-rural communities, who depend on the rural mail carrier, the school bus, and a thousand and one delivery and communication services essential to country dwellers. It should be apparent to the housewife who has to use the family car to do her marketing at shops which have moved out of urban centers. It should be apparent to the industrial worker who has to travel by car to plants located in outlying districts; to the operator of a fleet of trucks; to the industrialist who is becoming more and more dependent upon motor-vehicle transportation of raw materials to his plant and the finished product to his customer; to the wholesale vendor and

the retail distributor of perishable food products.

Yet though this economic importance of a superior highway system should be entirely obvious, it is not so apparent to the public consciousness. To John Q. Public, generally speaking, a road is a road. And even though it may be rough and uncomfortable to ride on, it serves his purpose fairly well if he can get from place to place on it. Little does he realize the cost to industry and commerce—and eventually to himself—of the rough surfaces, the narrow right-of-ways, the heavy grades, the needless curves, the dangerous intersections, and the constant need of maintenance. Indeed, the cost per mile of modern well engineered and well built highways seems tremendous to him, even outrageous, Mr. Knowles said.

John Q. Public needs to understand the national, overall situation. As State Senator Ralph Collier put it, in a report to the California State Legislature: "The efficiency of modern life, whether in business or recreation, is measured in terms of how long it takes to move from place to place; how much it costs in dollars and cents, and how much it costs in life, limb, and personal exasperation." And Senator Collier went on to say, "Our present highway plant is grossly deficient. It kills and maims people at seemingly insatiable rates in the face of demonstrated fact that engineering and enforcement can rid highway use of its major hazards." The statements made by Senator Collier apply equally to many other states.

And while John Q. Public is apathetic, commerce and industry take it for granted that our highways will be developed with the utmost efficiency. So assured are they of this fact that their program of invention, design, and expansion is carried on without the least doubt concerning the circumstances related to highway transportation. The manufacturer of motor cars and trucks designs his products for ever-increasing speed, comfort, and convenience, assuming with absolute assurance that perfect highways designed and maintained to produce safe driving conditions will without question be available.

Road Improvement Trails Demand

The truth of the matter is that our program of highway construction is far behind in the parade of progress, instead of being in the lead, or at least well up towards the front as it logically

should be. The improvements in motor vehicles and the demands for increased speed, comfort, and safety in highway transportation have far outstripped the nation's highway system.

Let us look for a moment at the causes of the lag, Mr. Knowles suggested. We can logically and properly lay some of the blame upon World War

II, which made unavailable for construction the materials and personnel essential to production for war. Too, we can cite the fact that from the beginning of highway history there has always existed a gap between vehicular development and highway construction; although it has been narrowed considerably.

(Concluded on next page)

ALLIS-CHALMERS SPECIFIES...

Velvetouch

ALL-METAL STEERING CLUTCH FACINGS ON THE NEW HD-19



Velvetouch cone clutch linings are also standard on Gar-Wood Models CU-1 and CU-2 cable control units.

Steering clutch disc for HD-19.

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siderably from time to time, it has never been bridged. But we cannot afford to let the matter rest with these excuses.

Beyond doubt, the main reason that highway construction has failed to keep pace with the increasing demands that have been made upon it by developments in all other fields of endeavor is John Q. Public's failure to understand the problems involved, the cost factors, and the urgency of the situation. For it is he who pays for the roads. Moreover, responsibility for his failure lies with the highway industry: because it has not done a better public-relations job. If it had, John Q. Public would have a fuller understanding of the situation and would have "come across" long ago.

Highway Industry Is a Team

However, the highway construction industry is a magnificent team of all-star performers whose accomplishments must not be minimized, said Mr. Knowles. Too often these days one hears the comment that the construction industry is out of date, unprogressive, unwilling to utilize modern methods of design and operation. Such detractors forget the ingenuity and versatility manifest in the airfields and other structures that transformed almost overnight the swamps and jungles of Pacific islands into beehives of scientific war activity. They forget the developments that have been made in construction materials and equipment. They forget the stupendous feats of construction that have been accomplished by American contractors in this country and abroad.

"Moving mountains", a saying men once used to express the impossible, is now an everyday occurrence, thanks to this team of contractors, engineers, equipment manufacturers, and material producers. And it is a team that can build the highways the nation needs.

President Truman said recently that there is a backlog of \$75,000,000,000 in public works which the country really needs. A very large part of this is roads. If spread over a 15-year period, the program calls for an annual outlay of \$5,000,000,000.

Now what should be done to condition this all-star team for the game ahead, Mr. Knowles asked? Such a program as has been outlined requires adequate engineering personnel first of all. Yet many of our states are now experiencing a serious shortage of engineers because the salaries they pay them are too low—are, in fact, inadequate, if required education and experience and responsibility-load are proper criteria to be employed in evaluating professional services. We must raise those salary scales if we are to get and retain adequate engineering personnel and keep our highway team functioning efficiently.

Second, equipment and material producers will have to make every effort to maintain prices at as low a level as possible, consistent with reasonable earnings. They will have to do everything in their power to improve production schedules so that there will be ample supplies of the necessary materials to meet the contractors' requirements.

Contractors, for their part, will have to make every possible effort to see that a reasonable number of competitive bids are submitted on the projects advertised. They will have to avoid unbalanced bidding and keep their prices as low as is consistent with a reasonable profit.

Every member of this team will have to keep constantly in mind that the maintenance of a financially sound and efficient construction industry is essential to the production of sound, permanent, safe, and efficient highways.

Finally, having organized and trained our all-star team for its performance, the next task is to sell the tickets to the public.

Perspective on Costs

Quite naturally in times like these, the public's sales resistance will focus on what it considers excessive costs. It is, therefore, very important to have at our command the true facts concerning highway construction costs in order to be able to accelerate the program now. To let high costs stop this great industrial team from functioning efficiently would be like refusing to eat because food prices are high, or refusing to wear an overcoat because overcoats are expensive.

Specifically, construction costs have increased less since December 31, 1945, than the composite index for wholesale prices of all commodities. It is an established fact that the increase in wholesale commodity prices since 1945 is 54 per cent, while the cost per composite mile of highway construction has risen only 31.5 per cent in the same period.

Nation-wide surveys which have been made during the past few months by the Associated General Contractors

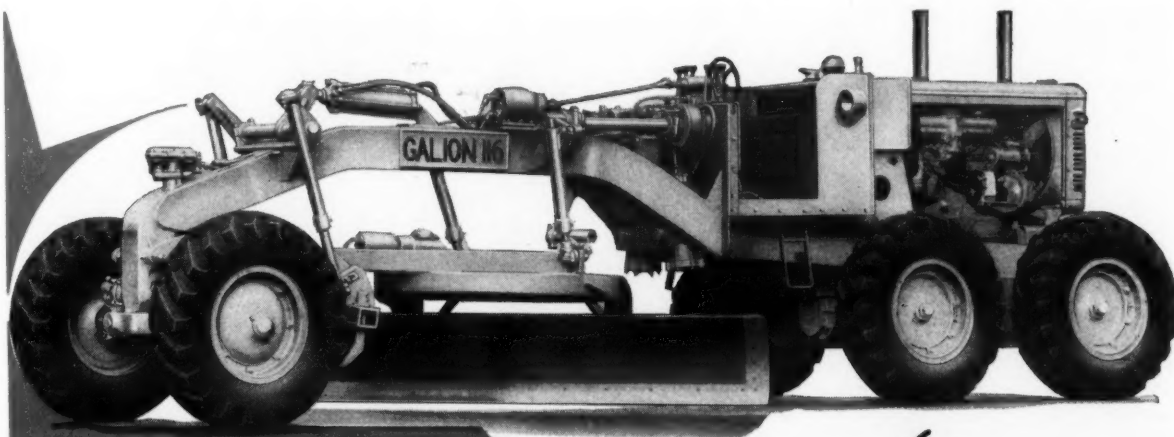
have brought out the fact that there is a definite trend towards the leveling off of road-construction costs. But even if costs increased, they would mean a loss to the public not nearly as great as the loss from delayed investment of public funds in good roads.

To function at maximum efficiency, our all-star team must be kept well nourished and busy. The highway construction industry must be maintained in a sound and healthy condition in order to produce sound, economically built highways to meet the commercial, industrial, educational, and strategic needs of the community.

Our blood stream must keep pace with our national growth in every field. Our engineering forces have the ability and experience, our materials and equipment producers are well under way, and our contractors can do the job. Our principal and immediate task, therefore, is to convince John Q. Public that "now is the accepted time" to accelerate the highway construction program.



Aggregate for the concrete used in Fort Gibson Dam travels a Goodrich belt, which is 2,000 feet long, to a 6-inch mesh. The belt operates at an angle of 17 degrees and a speed of 308 fpm. It is 30 inches wide and made of 5 plies of 32-ounce duck. Fort Gibson Dam, on the Grand River in Oklahoma, is scheduled for completion by 1950 at a cost of about \$35,000,000. It will protect 628,000 acres of fertile soil in the Arkansas River Valley flood plains.



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GRADERS • ROLLERS

Ohio Adopts System Of Uniform Markings

A program to obtain uniformity of highway markings is under way by the Ohio Department of Highways. The authorities point out that its purpose is to avoid any possible confusion on the part of the motorist driving anywhere in the state—and hence the accidents that stem from confusion.

A manual is being distributed which outlines the standards to be used by local communities in the marking of pavements or streets. This "Ohio Manual of Traffic Control Devices for Streets and Highways" was prepared by the Division of Traffic and Safety of the Ohio Highway Department in accordance with the Uniform Traffic Act. The types of markings prescribed in the manual include center lines, lane lines, no-passing zone markings, approaches to railroad crossings, stop lines, crosswalk lines, parking-stall markings, safety zones, islands, etc.

Special emphasis is being placed on the use of yellow no-passing lines. The State has adopted a system of using only white paint for center lines. When a yellow line appears on either side of this marker, it means that cars are not to cross over it into another lane. These lines are placed in areas where the view ahead is restricted and it is unsafe to pass.

President of The Moles

The Moles, New York society of tunnel and heavy-construction men, has elected J. Rich Steers, Jr., as President for 1948. Mr. Steers is head of the New York contracting firm that bears his name and that is now rebuilding war-damaged harbors in Greece. The company specializes in waterfront improvements. As the new President, Mr. Steers has named R. V. Hyland of Madison-Hyland Chairman of the Committee to select next year's recipients of The Moles annual awards for outstanding construction achievement.

Bar-Bending Machine

Bar-bending machines in two sizes are made by the Waterloo Steel & Equipment Co., 524 Park Road, Waterloo, Iowa. The Model No. 2 machine is for use with round or square bars up to and including 1 1/8 inches in size. The Model No. 3 is for use with round or square bars up to and including 1 1/4 inches.

The Waterloo bender is designed for bending bars to any angle required. The bending posts are made of turned steel, and the post revolving through a slot in the plate is equipped with a loose steel roller to prevent the bar from creeping while it is being bent. The Model No. 2 weighs 110 pounds, and the Model No. 3, 185 pounds. The bender can be bolted to a platform or to a heavy plank. A specially designed metal stand, weighing 90 pounds, has been made available by Waterloo.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 4.

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Interlocking Piling

Lightweight sheet piling is made by the L. B. Foster Co., Box 1647, Pittsburgh 20, Pa. It has an interlocking connection which features a large contact surface between adjacent sheets. The piling is stocked in any length and is made from 10 and 12-gage steel, with 8 or 14-gage also available. It has a deep-box corrugation section with corrugations 2 inches deep, laid on 6 $\frac{5}{8}$ -inch centers. Standard widths are 24 and 32 inches, with special sizes available on order.

Style No. 1024 10-gage piling has a weight per square foot of 8.94 pounds and a section modulus of 1.499. No. 1032 10-gage piling has a weight per square foot of 8.63 and the same section modulus. The 12-gage Style No. 1224 has a weight per square foot of 6.96 and a section modulus of 1.176. Style No. 1232 has the same section modulus and a weight per square foot of 6.71.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 15.

Raybestos-Manhattan News

John F. D. Rohrbach is the new President of Raybestos-Manhattan, Inc. He succeeds Sumner Simpson who has become Chairman of the Board and of the Finance Committee. The office of Chairman of the Board has been vacant since the death of Col. A. F. Townsend in 1940.

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A new type of package for Penn Drake Gumout is announced by the Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. Gumout is a liquid solvent for removing gum from carburetors, fuel lines, and other parts subject to this type of accumulation. It is now packaged in a 5-gallon metal container which has a fully removable cover. With the cover removed, the pail can be used as a cleaning vat designed to facilitate the use of Gumout as a bench cleaner.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

Hoists, Dump Bodies

A new dump body for use with standard pick-up trucks is made by the National Truck Equipment Co., Dept. No. 443, 225 Madison St., Waukesha, Wis. The Dump-O-Matic is hydraulically operated, cab-controlled, and features



The new Dump-O-Matic hydraulically operated dump body for use with $\frac{3}{4}$ or 1-ton trucks features a double-hoist unit; a single-hoist unit is made for $\frac{1}{2}$ -ton pick-ups.

a double-hoist unit. The twin-hoist unit is made in sizes to fit $\frac{3}{4}$ and 1-ton pick-ups; a single-hoist unit is also available for installing on $\frac{1}{2}$ -ton trucks.

Hydraulic power is obtained from a pump driven off the fan belt of the

truck. The entire unit is available for initial installation, or it can be supplied as a kit for converting trucks in use.

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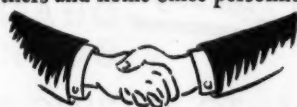
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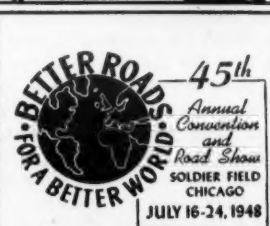
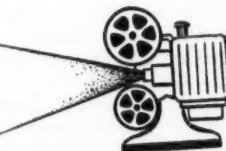
Figure

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Theory and Methods Of Soil Compaction

Good Road Building Calls For Knowledge of Why's And How's of Embankment And Subgrade Compaction

By TILTON E. SHELBURNE, Director
of Research, Virginia Department of
Highways

EMBANKMENT compaction is a subject in which all highway engineers are vitally interested. The improvement in earth-handling equipment and the provision for compaction of embankments and subgrades is one of the most important recent developments in highway engineering.

Accordingly, this paper reviews briefly the theory of soil-compaction phenomena, the reasons for compaction, methods of controlling it, and some more recent trends in its use.

Theory of Compaction

Soil, as considered from the highway engineers' point of view, is a complex material more variable in its physical characteristics than most other engineering materials. Often it consists of a combination of many sizes of particles varying in grain shape, composition, and amount of void spaces.

Proctor's compaction theory briefly stated is as follows: the ordinary soil mass is composed of gravels, sands, silts, and clays; and compaction is the process of forcing the fine grains into the voids between the larger grains. A water coating on the soil grains serves as a lubricant, reduces the friction between the soil particles, and helps the compacting force to arrange soil fines in the voids between the larger grains. If there is not enough moisture, then the compacting force may not be great enough to overcome frictional resistance, and a low density will result.

It has been found that with a given compactive effort, the density of the soil can be increased if the moisture content is increased until a particular optimum is reached; but beyond that optimum point, the density is decreased by additional moisture. Thus, for a given compactive effort there is one moisture content—called the "optimum"—for a given soil. It is a moisture content the soil must have if it is to obtain maximum density for that type of compaction. If the moisture content is increased beyond the optimum, the increase in the thickness of the moisture film causes a corresponding increase in the separation of the soil grains, and a lower density results.

This theory seems reasonable, since soils with about the same composition and gradation usually have comparable densities and optimum moisture contents. Also, fine-grained soils require more moisture for adequate lubrication than do coarse-grained ones. If the compactive effort is increased, the maximum density increases and the optimum moisture decreases. Still another support for the theory is the fact that the moisture-density curve for a granular soil has a decided peak, indicating that the moisture content for this material is critical. On the other hand, similar curves for the more plastic fine-grained soils are relatively flat, indicating a less critical moisture content.

Field experience has shown that materials compacted at the optimum moisture content undergo most of their consolidation during the time of construction or original loading. On the other hand, dry soils placed in embankments may show little or no consolidation until the embankment has become saturated.

The dry density for cohesive plastic clays has been found to be less than 100 pounds; for silty clays it is from 100 to 110 pounds; for silts it is from 110 to 120 pounds; and for the more granular soils it is 120 pounds per cubic foot or greater. Thus, density tests can be used as an aid in soil classification. Laboratory compaction tests are valuable in comparing the maximum density which can be obtained from different types of soils. But of more importance, perhaps, is the use of data from the tests for actually controlling compaction during field operations.

Reasons for Compaction

At least three valid reasons have been advanced for compacting embankment—
(Continued on next page)

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ments: (1) to eliminate or minimize settlement or consolidation, (2) to lower the permeability of the soil mass, and (3) to increase its strength or stability.

There is little need to discuss the desirability of these goals. If we are to build and maintain roads with good riding qualities, we certainly want to eliminate or minimize the settlement of fills or embankments. The important point is that the experience of many highway departments has shown conclusively that adequate compaction can eliminate future fill settlements.

As for the permeability of a soil mass, observations have shown extremely wide variation in it, depending upon moisture conditions during placement. In general, it has been found that soils compacted dry have percolation rates that are many times those of the same soils compacted wet. The optimum moisture content is important for securing maximum density; however, the stability of the soil mass depends chiefly upon the moisture content that the soil mass may attain at some later date. By proper compaction the voids may be reduced so that the soil cannot hold harmful amounts of moisture. Many highway departments have found that with poorly consolidated soils there is immediate danger of sloughing and sliding if the material is exposed to saturation by ground-water percolation, rains, and floods. Adequate compaction has been found to increase the stability to such an extent as to eliminate failure when the fill is subjected to floodwaters.

From the contractor's point of view, proper fill compaction is a distinct advantage. A well compacted fill does not absorb as much water as a poorly compacted one. Thus, the contractor's work is not delayed as much during rainy weather if proper compaction is attained. Often, however, he encounters soils which in their natural state have a moisture content near the optimum. His problem then is not one of adding water, except in extremely dry periods, but of drying excess moisture out of the soils through aeration.

While all of the preceding discussion has dealt with embankment compaction, it might be emphasized at this time that the matter of density is even more important in stabilized bases. The stabilized-base course is not only subjected to more concentrated traffic loads, so that it must have higher strength or stability, but it is also so located that saturation may more readily occur. Satisfactory base performance has resulted when materials are compacted to such a density that there is no room for harmful excess moisture.

Methods of Field Control

Having established the reasons for compaction, we should consider next the ways to control it in the field.

Many states specify that all embankments must be constructed in layers not exceeding 6 or 8 inches; some states, on the other hand, permit layers up to 12 or 18 inches. The percentage of compaction they specify usually follows AASHO standards—90 to 100 per cent. Some states, however, depart from this procedure and prefer to specify either the number of passes of the roller or the amount of compactive equipment that the contractor must furnish.

For example, North Carolina requires two trips of the roller per inch of loose thickness of layer. Thus, for a 6-inch compacted layer about 9 or 10 passes would be required. Two states, California and Massachusetts, specify the amount of rolling equipment that the contractor must have on the job, depending upon the yardage of embankment being placed per hour. California requires one 3-wheel roller or one 8-foot-wide sheepfoot roller for each 150 cubic yards of embankment placed per hour. Massachusetts specifies that at least one power or tamping roller

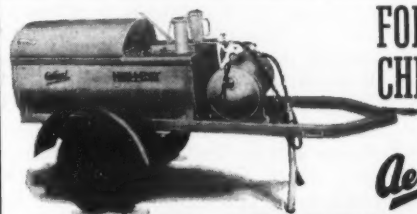
shall be provided and shall be in constant use for each 100 cubic yards or fraction thereof of embankment material placed per hour.

In connection with an ARBA committee on Rigid Pavement Design, a questionnaire was sent about a year ago to all 48 state highway departments to ascertain their practice in dealing with subgrade soils. While changes may have been made during the past year, a summary of the answers revealed that most of the states use the Public Roads Administration soil classification; however, in some instances this is modified to suit local conditions.

While it is recognized that conditions vary from state to state and even within states, it is difficult to account for the apparent lack of consideration of compaction requirements indicated in the replies. If accurate compaction control is to be exercised in the field, then preliminary soil surveys must be made and the type, extent, and characteristics of all soils throughout the project must be determined. By determining the densi-

ties of undisturbed soils, the per cent of shrinkage can be computed. This particular phase of the work can be most helpful to the design engineer.

One difficulty in field control is that the soil types on any particular project may vary widely. Thus, the engineer on (Concluded on next page)



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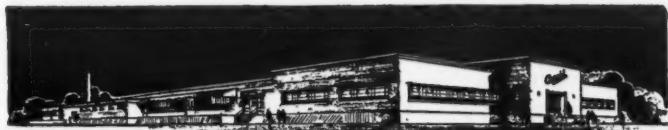
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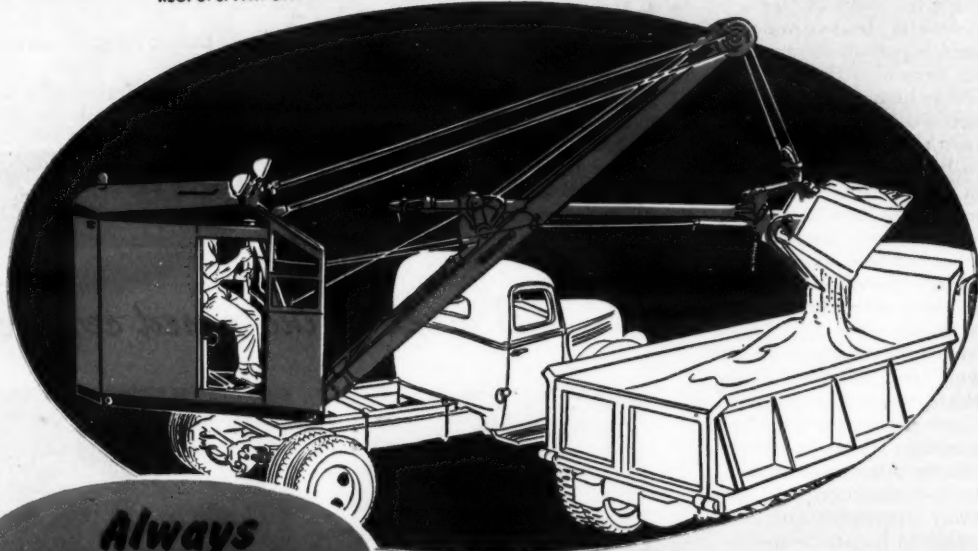
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Theory and Methods Of Soil Compaction

(Continued from preceding page)

the job must exercise judgement in selecting samples and interpreting results. Another important point to be taken into account is the presence of plus No. 4 material, since all laboratory compaction tests are usually performed on only the minus No. 4 material. At least two methods are available for correcting this discrepancy. Some departments have tabulated extensive data on soils throughout the state and have established typical curves which can be used efficiently for field control. The work of the Ohio Department of Highways has been outstanding in this respect.

Trends in Compaction

With the advent of heavier loads during the war and the construction of airport facilities to accommodate heavier aircraft, engineers are giving increased attention to super-compaction. On airport work it has been found that super-compaction of the base and subgrade is essential if settlements under these heavy loads are to be held at minimum. Some engineers recommend super-compaction of all materials for a depth of at least 5 feet below the pavement surface for major airports.

Laboratory density tests employ heavier rammers which are dropped at greater heights than with the standard Proctor test. This higher density is of course obtained at a lower optimum moisture content. To secure comparable field densities heavy rollers are employed—in some cases, rollers weighing up to 100 tons have been used.

Compaction and more particularly super-compaction has been found practical with the more granular materials and can be used with all materials that are inherently stable when they contain optimum moisture. Materials which have high swell tendencies, or those with high plasticity and remolding characteristics, are not considered suitable for compaction; these materials tend to lose density after construction.

Whether super-compaction will be used by highway engineers for embankment compaction is open to speculation; however, it is predicted that improvements will be made in the near future in equipment and procedures for compacting granular bases. Considerable work is now in progress, both in the laboratory and in the field, in the use of vibratory compaction. Any improvements that can be made, either in equipment or procedure, for securing better compaction of subgrades and bases will be a step in the right direction, and will result in better pavement performance and reduced maintenance costs.

From a paper presented at the Sixth Annual Meeting of the Southeastern Association of State Highway Officials, at Miami, Fla., December 8, 1947.

Blast Tests Planned On Buried Structures

The effect of explosions on underground structures is being studied by the Army Engineer Corps. Blast charges will run as high as 320,000 pounds of TNT, according to Lieutenant General R. A. Wheeler, Chief of Engineers. The tests will be conducted at the Dugway Proving Grounds near Salt Lake City, Utah; near Castle Dale, Utah, and near Grand Junction, Colo.

The tests are being conducted on four types of soil—dry sand, wet sand, dry clay, and wet clay; and on four types of rock—granite, sandstone, limestone, and shale. The engineers feel that these ground conditions are typical of those found in different parts of the United States. The soil and limestone tests are being conducted at Dugway; the sandstone and shale tests, near Castle Dale; and the granite tests, near Grand

Junction. Gen. Wheeler emphasized that no atomic bombs will be used in these tests.

The explosions will be of different sizes, all with definite scale relationship. The smallest charge will be the 1/10 scale, or 320 pounds of TNT; the next will be the 2/10 scale, or 2,560 pounds; the third will be the 5/10 scale, or 40,000 pounds; and the fourth and largest charge will be the full scale, or 320,000 pounds of TNT. This large charge will be applied only to the dry sand, dry clay, granite, and sandstone formations. The 40,000 charge will be used on all types except the wet sand. The smaller charges will be applied to all the testing sites.

The tests will provide the Corps of Engineers with technical knowledge—based on actual experiments—of the type of underground facilities best able to withstand the effects of modern bombs and guided missiles. The tests are aimed primarily at determining the requirements for Command Posts, Air Defense Control Centers, and other vital military installations. In addition, they will be of value in setting up standards for the design of underground industrial plants, should they ever be required.

Morrison-Knudsen Co., Inc., of Boise, Idaho, has been awarded a contract to build the concrete structures, tunnels, and necessary adjacent camp facilities, and to place the explosive charges. Engineering Research Associates, Inc., St. Paul, Minn., has the contract for developing and acquiring the instrumentation needed, and conducting recordings of the explosion tests. The Colorado School of Mines has been engaged for consulting services and to conduct preliminary small-scale tests in rock. A

special board has been set up for scientific guidance in planning the tests and proper analysis of the results.

The Office of the Chief of Engineers is charged with the technical direction of the tests. And the Army Ordnance Department is collaborating in furnishing technical assistance and supplying the necessary explosives. Field operations are under the supervision of the District Engineer, Sacramento, Calif.

CP Tool Co. Exec. Dies

Allan E. Goodhue, Vice President and Director of the Chicago Pneumatic Tool Co., died recently after a short illness. Mr. Goodhue joined Chicago Pneumatic in 1919, and managed the company's interests in England until June, 1920, when he returned to the United States as Vice President in Charge of Sales.

Dual-Fuel Attachment

A catalog describing its new dual-fuel attachment is available from the Caterpillar Tractor Co., Peoria 8, Ill. The device permits the use of either diesel fuel or natural gas with the D13000 engine. This 4-page folder emphasizes the versatility of the engine with the new attachment, and points out the advantages of being able to use two fuels, according to which is cheaper or in more abundant supply at the time.

Form No. 10745 shows photographs of the D13000 equipped with the dual-fuel attachment and lists several installations of the engine. It also gives data on the horsepower output and fuel consumption of the dual-fuel engine.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 103.

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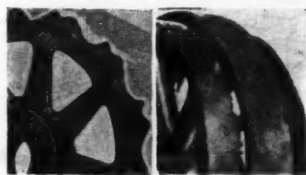
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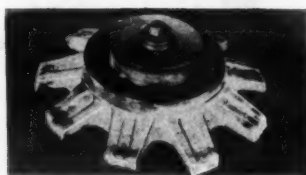
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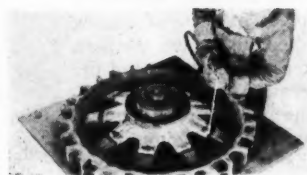
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A reversing and reduction gear box has been installed on the 1948 Scoopmobile to provide additional gear reduction of 3.01 to 1 forward and 2.5 to 1 reverse. The gear box is also available as an accessory to existing Model B Scoopmobiles.

Reduction Gear Box For End-Loading Unit

A reversing and reduction gear box has been installed as standard equipment on its 1948 Scoopmobiles, announces Mixermobile Distributors, Inc., 6855 N. E. Halsey St., Portland 16, Ore. This unit provides an additional gear-reduction ratio of 3.01 to 1 for forward travel, and 2.5 to 1 in reverse.

The unit also permits the pre-selection of four operating speeds in either direction, and the reduction of forward speed to less than 100 feet per minute. This synchronizes the speed of forward travel with the speed of the closing action of the Scoopmobile's bucket. The gear box is also available for existing Model B Scoopmobiles.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 43.

Line of Power Hoists

Power hoists in several sizes are made by the King Mfg. Corp., 3152 W. Chicago Ave., Chicago 22, Ill. They are gasoline-driven and are mounted on a wheelbarrow type of chassis for ease in moving from one location to another.

The 2-hp Model No. 250 hoist is said to lift a load of 200 pounds at a speed of 300 fpm when equipped with its standard gearing. Special gearing permits handling loads of 300 pounds at 200 fpm, 200 pounds at 300 fpm, or 150 pounds at 400 fpm. These ratings are for engine speeds of 2,700 rpm. The engine can be run at speeds of from 500 to 3,200 rpm.

The 5-hp Model No. 450 hoist is rated at 500 pounds at 300 fpm, with special gear arrangements to permit other loads and speeds.

The 3-hp Model No. 325-B and the 5-hp Model No. 325-ZZ supplement the Model 350 hoist; they have the same engine but are more compact. The 325-B is rated at 300 pounds at 300 fpm, with special gear arrangements to permit other loads and speeds. The Model No. 325-ZZ is rated at 500 pounds at 300 fpm, also with special gear arrangements available.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 39.

Manual on Wire-Rope Usage

A manual on the selection and maintenance of wire rope has been prepared by the American Cable Division of the American Chain & Cable Co., Inc., Wilkes-Barre, Pa. It has been written to show users how to obtain better, longer, and more efficient service from wire rope.

Catalog C-8465 describes the destructive forces which wire rope must meet, and tells how to reduce that destruction. The forces so described are fatigue, abrasion, crushing, and internal friction. The bulletin also describes the faults caused by poor handling—kinks,

failure to line up sheaves, poor seating due to incorrect sizes of grooves or cable, etc.

The manual points out how to handle wire rope properly, and gives suggestions for applying clips, attaching rope to the drum, and ordering. It tells how wire rope is built up and the system for naming the various sizes and lays commonly in use. The manual also lists the various types of service to which wire rope is put and makes recommendations as to types and sizes best suited for each job. It contains a complete listing of the weight and strength of the various wire ropes supplied by the American Cable Division.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 11.

Stabilizer's Speed Is 3,000 Feet a Day

A production rate of 3,000 linear feet per day of soil stabilization was recently chalked up by a P&H single-pass soil stabilizer, it is reported. The record was made on a soil-bituminous road project in Lauderdale County, in Mississippi. The road is 10½ miles long, 22 feet wide, and was processed to a depth of 6 inches, compacted. The P&H stabilizer is made by the Harnischfeger Corp., 4419 W. National Ave., Milwaukee, Wis.

The project was worked in a natural soil of A-2 classification with a plasticity index of 5 or less, and clay with a PI of 19. These were combined with sand to produce a material with an A-2

classification. The stabilizing agent was an RC-2 asphalt spread at a rate of 4.32 gallons per square yard. This was equal to 7 per cent, by weight, of the dry soil.

Steel-Gratings Catalog

A new catalog illustrating and explaining the uses of its steel gratings can now be obtained from the William F. Klemp Co., 6644 S. Melvina Ave., Chicago 38, Ill. This company manufactures a complete line of riveted and welded gratings for use in open steel or aluminum floorings, gratings, stair treads, catwalks, and structural-steel walkways.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 64.

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For loads too long or too heavy for a single trailer there are ROGERS POLE TRAILERS which support the rear of the load while the front is carried on a special swivel bolster mounted on the large trailer.

EXPERIENCE builds 'em
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Loads too large or too heavy for railroad handling, such as shown above, ride to their destination quickly and safely on ROGERS TRAILERS.

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Bituminous Sealing Done by County Crew

Roads Are Maintained and Improved on Small Budget In Agricultural County; Addition to Shop

† **ALTHOUGH** Shelby County, Indiana, has a population of only 25,953 (1940 census), with a resultant low budget for its Highway Department, its roads can hold their own with any of the more wealthy and heavily populated counties in the Hoosier State. This is because the county highway authorities are indeed conscious of the satisfactory results at low cost that are possible in the choice of bituminous roads. Along with that knowledge, they possess the know-how and facilities for turning out and maintaining smooth-surfaced highways with the use of only two materials: stone or gravel and either asphalt or tar.

In 1946, for instance, over 100 miles of old black-top roads were greatly improved by giving them a bituminous seal treatment of RC-3 asphalt topped by a layer of stone, 1/4-inch down. All the county road work is done by county forces. And these maintenance men know more than just road building. Their versatility was demonstrated last year when they built an addition to the garage-shop located in Shelbyville, the county seat.

Shelby County

Shelby County occupies 408 square miles in the heart of Indiana. Centrally located Shelbyville, with a population of 10,791, is a natural hub for this agricultural area, with six state highways radiating out from it. The topography is flat or gently rolling, and beneath the rich farming topsoil is a goodly supply of gravel. Other suitable road-building material is found in the southern sector where several stone quarries are located. The County purchases material from these pits and quarries which are privately owned.

The three Commissioners who govern the county are elected to a 3-year term of office. An election is held for one commissioner each year. The present organization consists of R. A. Martin, President, and members Harold Linville and Charles Howe. They look after the north, central, and southern sections of the county respectively, but equipment and supplies are purchased through the main office for use in the county as a whole. They appoint the County Superintendent of Highways who serves a 1-year term. The incumbent, Hubert Thompson, is now serving his third year as Superintendent.

Of the 820 miles of county roads, 180 miles are black-topped, while the remaining 640 miles are either gravel or stone. Flash floods and the overflowing of the banks of rivers and streams on several occasions during 1947 caused much damage by washing out the gravel and stone roads. Traffic over the county roads has also greatly increased, especially with heavier and faster trucks that throw material off the non-surfaced roads, creating a continual maintenance problem. For this reason the County aims to seal or surface-treat with bituminous materials as many of these non-paved roads as possible. The pavement on the improved roads is usually 18 feet wide, while the average width of the gravel or stone roads is 14 to 16 feet. The right-of-way, or taking line between fences, is usually 32 feet.

Funds for county highway use are obtained solely from the state gasoline-tax money. Allocations from this source are made on the basis of the number of automobile registrations within the

county. Registrations fell off during 1947 so a budget of only \$120,000 was available for construction and maintenance, while a program of \$160,000 was anticipated. Labor and equipment costs have also soared, so as a result fewer miles of roads could be improved and much needed equipment could not be purchased to meet all the requirements of the Highway Department.

Roads and Bridges

On the first Monday of each month the Commissioners meet and award contracts for furnishing the gravel necessary for the ensuing month. In building a bituminous-mat road, washed gravel is purchased and added as a topping for the pit-run gravel that makes up the base of the existing road. The



C. & E. M. Photo

Here is a front view of the Shelby County Highway Department shop at Shelbyville, Ind. Department men built the new concrete-block wing.

gravel is hauled from the various commercial plants to the job in trucks, rented by the hour when the hauls are short or by the yard or ton when the hauls are long. Enough privately owned

dump trucks are available throughout the county to hire at reasonable rates, so the County has not missed too much the lack of a large fleet of trucks of its

(Continued on next page)

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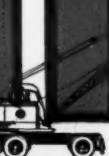
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own. When stone is available it is generally used in preference to gravel for road work.

The material, under $\frac{3}{4}$ -inch in gradation, is tail-gated down the middle of the road in a windrow. Two Adams motor graders then split the windrow, moving half the material to one side of the road where the bitumen, usually RT-7 tar, is added from an Etnyre 1,000-gallon distributor mounted on a GMC 2-ton truck. The operation is repeated with the other half of the windrow on the other side of the road. The graders blade the mixture of aggregate and bitumen back and forth over the road until they are well blended. Then the material is spread out, forming a mat 2 inches or more thick, and rolled with a Galion 6-ton tandem roller. A mile of this type of surface can be laid in a day, using from 10,000 to 12,000 gallons of bitumen to the mile.

Shelby County has excellent facilities for storing and handling bituminous materials. On a 2-acre yard off Pike Street at the north end of Shelbyville, the Highway Department has a 10,000-gallon horizontal and a 30,000-gallon vertical storage tank. A rail siding runs into the yard from the tracks of the Cleveland, Cincinnati, Chicago & St. Louis, or Big Four Division of the New York Central Railroad. Adjoining the siding is a 12 x 12-foot corrugated-metal pumping station which houses a Cleaver-Brooks tank-car heater. This unit furnishes steam to heat the tank cars and the storage tanks, and to operate the Dean 3-inch pump which can unload a 10,000-gallon tank car in 5 hours. A 180-gallon fuel-oil tank supplies oil for the heating unit.

Also located on this same parcel of land is another corrugated-metal building, 25 feet square, which is used for the storage of bridge and form lumber. With asphalt or tar always available, along with stockpiles of aggregate, and the necessary equipment such as distributor and roller, patching of the bituminous roads is done as soon as any indication is given that it is required. By catching any bad spots early, a great deal of time and money is saved and the roads are always kept in good shape.

As a result of flood damage the County found it necessary in 1947 to construct two new 20-foot-span concrete culverts. Bridge and culvert work is handled by a 4-man crew and a 1-bag concrete mixer. Most of the work, however, is on repairs to existing structures such as to the wood floors of two steel truss bridges, 360 and 215 feet long, which were improved last year. Because of the traffic, difficulty had been experienced in holding the bridge planking in place. This was solved by bolting the planks to the I-beam cross members and laying two plank runways on top of the deck. These runways are 3 feet wide and $5\frac{1}{2}$ feet on centers, consisting of 3 x 6's or 3 x 10's. After they were securely fastened by spikes they were given a bituminous seal treatment of tar and pea gravel. As a result of this smoother riding surface no more trouble was experienced with planks working loose from the deck.

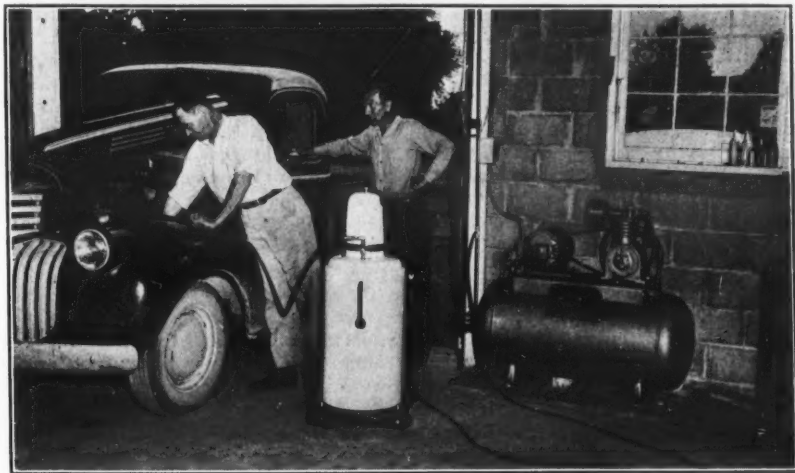
A regular force of 15 employees is kept on throughout the year, with more men added in the winter, if necessary, for snow removal. The two motor graders are used in snow work, one stationed in the northern and the other in the southern part of the county. The County now has one Ross wing-type snow plow which is mounted on an International K7 truck; and when the Department was visited it had another on order, to be placed on a new White 2-ton truck—also on order. Considerable difficulty has been experienced with other equipment which the County has been trying to obtain, such as another motor grader and power mower.

Other County-owned equipment not already mentioned includes: three I-30

International rubber-tired tractors which pull Adams leaning-wheel maintainers for grading the gravel or stone roads; two other Adams maintainers, Model 62, which are pulled by a Moline and an International 1-9 rubber-tired tractor; two Chevrolet trucks, dump and pickup bodies; a Hough sweeper; and a 15-ton low-bed trailer. The County also has a Caterpillar Sixty tractor which has pulled an Adams grader, but these units have not been in use during the last couple of years.

County Shop

Equipment is stored and maintained at the county shop fronting on East Broadway in Shelbyville. The County acquired the 150-foot deep x 52-foot front building 14 years ago when it was used as a community sale barn. At that time half the front width was only a tin shed with a dirt floor extending 40 feet to the rear, and it was infested with rats. In 1946 the bridge gang ripped out this old wing and built a new addition



C. & E. M. Photo

At the Shelby County shop, Mechanic Roy Leffler greases a fitting on a Chevrolet pick-up truck with an Alemite grease gun; compressed air is supplied from a Kellogg-American compressor. County Superintendent of Highways Hubert Thompson looks on.

with concrete blocks, 26 feet on the front and 40 feet deep.

Now used as an oil-storage and lubrication (Concluded on next page)

Barber-Greene



720 Ditcher

For digging trenches 8" to 11" wide—up to 4 feet in depth. Digging speeds up to 32 F.P.M.; traveling speeds as high as 234 F.P.M. adjustable spoils conveyor discharges on either side. Three-position boom adjustable to dig close to obstructions. Simple B-G controls, easy steering.

Two great new ditchers in the B.G. line!

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Digs trenches $5\frac{1}{2}$ " wide up to 42" deep. Digging speeds up to 32 F.P.M.; travel speeds up to 234 F.P.M. Vertical three-position boom digs close to obstructions. Cable-laying attachment available to feed cable and plow over the spoil in one continuous pass.



These two new ditchers bring exclusive, time-proved B-G advantages . . . the B-G Vertical Boom that digs straight down, leaves no ramp . . . close-spaced, self-cleaning buckets that cut, like a milling machine, into toughest ground . . . the patented B-G overload Release for greater protection . . . plus special features for their types of service.

Ask your Barber-Greene distributor for full details on the B-G Ditcher which interests you — or write to Barber-Greene Company, Aurora, Illinois.



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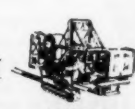
COAL MACHINES



BITUMINOUS PLANTS



FINISHERS



DITCHERS

Bituminous Sealing Done by County Crew

(Continued from preceding page)

rication room, the new wing has a concrete floor with drains, is well illuminated by overhead electric lights, and is heated by a coal stove in the winter. Equipment enters from the front through a 12-foot-wide x 10-foot-high overhead door. Suspended from an I-beam in the roof and running the length of the room is a Weston 5-ton hoist. Convenient outlets are installed around the sides for air and electrical connections.

Previously all equipment had been greased by hand. Now the units are lubricated with high-pressure guns working on compressed air. A new Kellogg-American air compressor has been installed just inside the main entrance to supply air to the new Alemite high-pressure grease unit. Against the back wall is a workbench, 12 feet long x 18 inches wide, on which are mounted two Diehl 8-inch bench grinders. Some replacement parts are stored here in wooden bins. The room also serves as storage space for the drums of Phillips 66 motor oil.

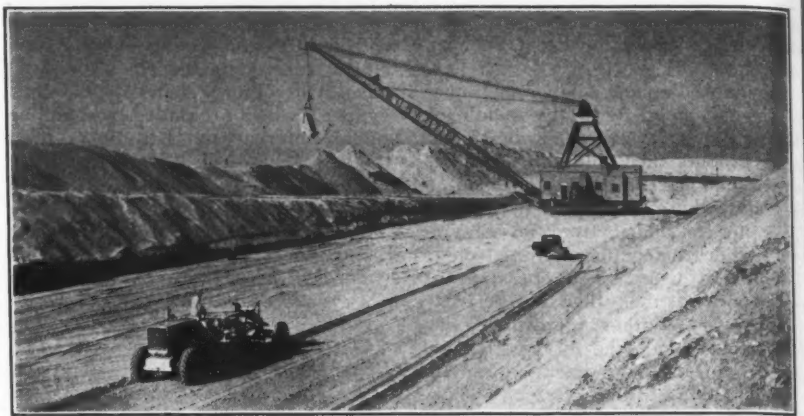
The other half of the front of the shop, also 26 x 40, is used as a machine shop and is entered from the front through a 10 x 10-foot sliding door. This section is also of concrete-block construction with a concrete floor, and is heated by a coal stove. Overhead is an I-beam supporting a Yale 2-ton hoist. Besides small tools for the mechanic, equipment here includes an oxyacetylene welding set, a 3-foot-square welding table, a 200-pound anvil, and a 6-inch grinder. Small work is done on a 12 x 3-foot bench which contains a 4 and an 8-inch vise.

To the rear of the machine shop is the 12 x 22-foot office of the County Highway Superintendent, with a toilet adjoining. Behind the grease room is a 26 x 20-foot enclosure for tool storage where picks, rakes, shovels, etc., are kept. At the rear of the building is a 40 x 15-foot sign shop, heated by a stove. Metal signs are purchased from state institutions such as penitentiaries, and fastened here to wooden stakes for erection along the roads. During the winter the old signs are taken down and brought here for a fresh coat of paint which is applied by hand brushes.

The rest of the long concrete-block

building is given over to truck and tractor storage. Though it has a concrete floor it is unheated; hence it is used chiefly for equipment storage. Wooden trusses support a wooden roof, and the structure is well illuminated with windows on both sides. Entrance is gained at the rear through a 12 x 10-foot swinging door and at one side through a 12 x 10-foot sliding door. One mechanic is always stationed at the shop and others are brought in when necessary.

With a small force and limited funds, Superintendent of Highways Hubert Thompson maintains the roads of Shelby County in first-class shape. His seven years' experience as a contractor's superintendent has stood him in good stead in handling both men and equipment. He can and does operate any of the road-building machinery, and on occasion can be found working with a shovel in a ditch or setting drainage pipe. Intelligent direction and a capacity for work are what produce an efficient county highway department.

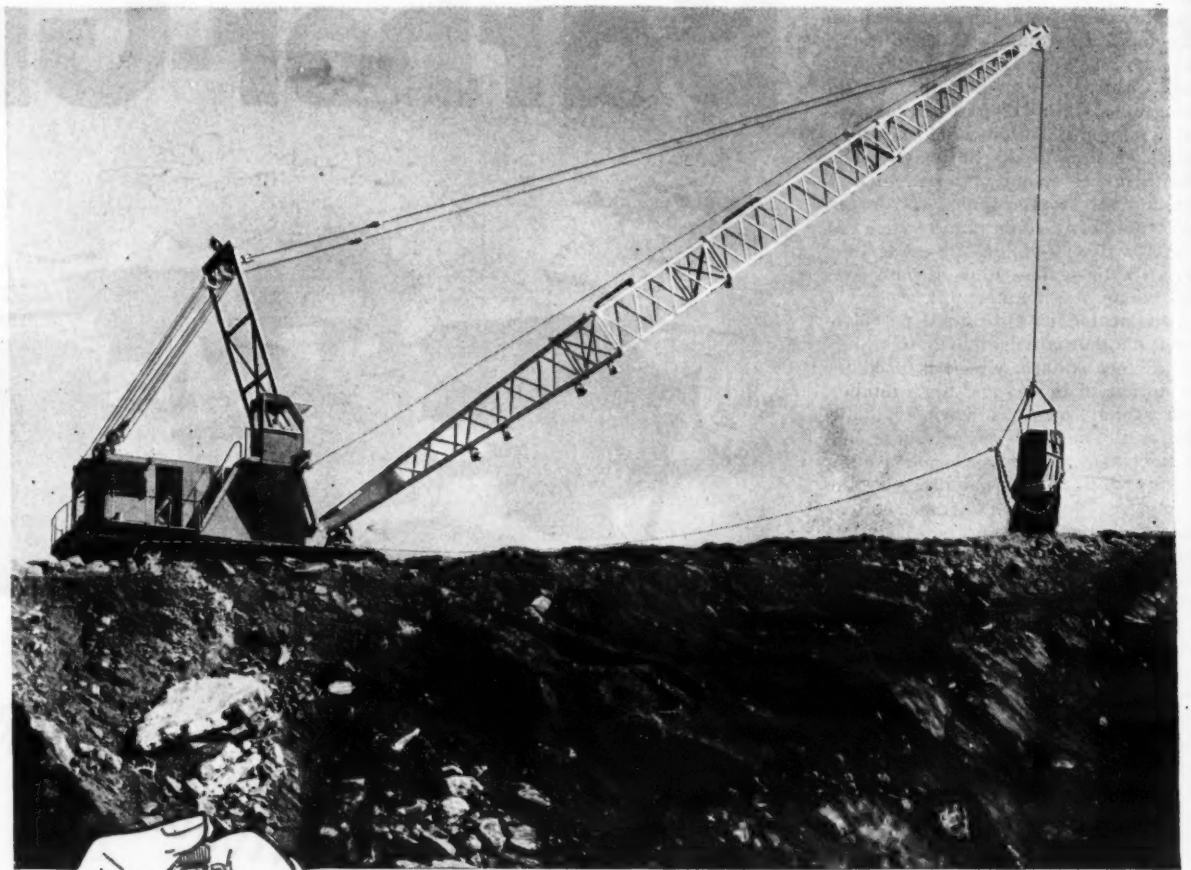


Excavation for the main canal of the Central Valley Project 6 miles west of Tracy, Calif., is shown here. A Caterpillar No. 12 motor grader smooths the canal bed ahead of a Bucyrus-Monaghan excavator. The equipment is owned by Morrison-Knudsen, Inc., and M. H. Hasler of Tracy.

Chicago Office for Turner

The Turner Construction Co. has opened an office in Chicago. Located in the Bankers' Bldg., 105 W. Adams

St., it is under the supervision of Clarke I. Knudson, contract engineer. This is Turner's fourth office; the others are located in New York City, Philadelphia, and Boston.



Manitowoc crane and dragline owned by the Coal Rain Coal Co., Junedale, Penna., and powered with a General Motors Series 71 "Twin" Diesel engine.

A pass every 50 seconds

WHEN you drag a four-yard bucket from the end of a 140-foot boom and make a pass every 50 seconds, you're really

moving material.

This is what the Coal Rain Coal Co. is doing with a Manitowoc crane powered with a General Motors Twin 6 Diesel engine.

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stroke, pick-up is fast, response is rapid, and there's unusual power for a Diesel so compact, so reasonable in size and weight.

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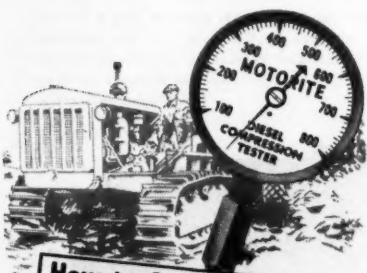
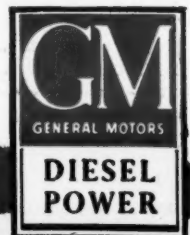
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For full particulars write for Leaflet 605.

ATTENTION Distributors: Diesel equipment and accessory jobbers are invited to write for information about attractive distribution proposition.

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7000 Bennett Street - Pittsburgh 8, Pa.

Levee Constructed To Safeguard City

Section 1.7 Miles Long Requires Laying of Large Sewer Pipes to Take Care Of Drainage

WHEN the Ohio River swept over its banks into Louisville, Ky., in the great flood of 1937, the city was made grimly aware that its position on the high left bank of the river did not render it immune from flood waters. At best, that natural protection had been spotty, with elevations varying along the river bank. But as the last previous flood of consequence had occurred back in 1913, the city had grown forgetful of the rampage that the beautiful Ohio could, at times, demonstrate. After the 1937 demonstration, the Corps of Engineers conceived a plan of protection for the city and got ready to put it into execution.

Then the war intervened, and the plan was shelved for more important considerations. After the war the plan was brought up to date and the flood-protection project was put under construction.

Early in 1947 the Corps of Engineers, Louisville District, awarded a \$727,220 contract to Terry & Steadman, Inc., of Bay City, Mich. It called for the construction of an earth levee 8,804 feet or 1.7 miles long, together with a comprehensive sewer system to drain the area behind the levee, since the earth wall would cut off natural drainage to the river. This particular contract is known as Section C.

Two adjoining sections, A and B, upstream of the present construction will later provide protection with concrete walls. Section D, adjoining downstream, will be a combination of wall and levee. (Terry & Steadman, Inc., has also been awarded the contract for this section.) Section E, farther down, will be the county levee. Thus the entire city located within the great bend of the Ohio will be afforded protection. Work on Section C got under way the middle of March, 1947. The completion date was scheduled for April, 1948.

Clearing the Site

Section C runs nearly east and west. It begins on the east end at the Kentucky & Indiana Terminal RR bridge over the Ohio, and extends to Duncan Street and Western Parkway opposite the Shawnee Golf Course at the west end. The levee is back 1,000 to 1,500 feet from the river. The area in between was a nearly abandoned section of the city. An old brickworks that stood there was not used after the 1913 flood, and was crumbling in ruins. So also was a venerable distillery and warehouse that had collapsed during the 1937 flood. However, scattered over the flat lands along the river bank were about 70 houses, many of them still occupied.

Under arrangements with the War Department the City of Louisville acquired the necessary right-of-way, and cleared the site of all structures down to the foundation level. Because of the acute housing shortage the City bought

up the homes in this area, and then sold them back to the owners for a nominal sum so that they could be moved to another location and still used. In this transaction many of the houses that were in fairly good condition were shifted to other sites within the city.

Then the contractor came into the picture. With a Northwest Model 25 3/4-yard Pullshovel, he dug out the remaining foundations, fire cisterns, wells, and old sewer lines. The rubble was wasted in some low places at the east end of the job near the K. & I.T. RR bridge. A Northwest dragline with a 3/4-yard bucket filled in the holes caused by the removal of the foundations. A section about 1/4 mile long was prepared at the very start of the work so that the contractor could haul material from the



C. & E. M. Photo

Guess we might as well pose and get it over with—Superintendent O. L. Jones (left), L. H. Terry of the contracting firm, and Resident Engineer John H. Krema for the Corps of Engineers.

river-side borrow pits to begin construction of the levee. Sufficient stripping was done so that the placement of

dirt in the embankment got under way on May 29.

(Continued on next page)

Nothing Doing—



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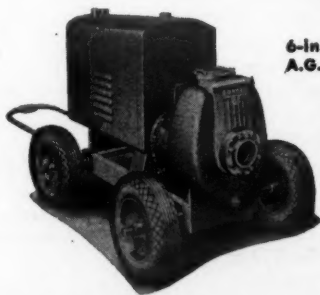
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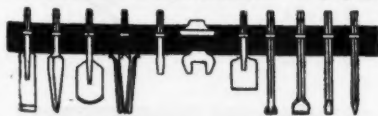
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We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

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BICKNELL MANUFACTURING CO.

12 LIME STREET ROCKLAND, MAINE

Levee Constructed To Safeguard City

(Continued from preceding page)

Earth-Levee Section

The earth levee is being built to elevation 463, or 3 feet above the level of the 1937 flood. It will have a crest width of 12 feet with 1 on 3 slopes on both river and land sides. On the river side an 18-inch layer of riprap will be placed on a 9-inch gravel blanket up to a point 13 feet below the top of the levee. This will prevent the slope from scouring and eroding. From the toe of the slope on the river side a berm will extend outwards at least 40 feet wide. At the end of the berm a 1 on 2 slope will drop down for 10 feet. The drop will continue with a 1 on 10 slope until the limiting depth of the borrow pit, or elevation 422.0, is reached. Beyond that towards the river the slope is 1 on 500 for drainage purposes.

All material required for building the levee is taken from river-side borrow pits. It is expected that these pits will eventually be filled in with the silt normally carried by the river and deposited during high-water stages. The pit material is a combination of silt and clay containing a small percentage of sand. Being close to the river, this dirt contained a high degree of natural moisture. This made for good compaction, but in order not to have the material dry out before it was placed in the embankment, only a small area of the pit was opened at a time.

To reach the crest elevation the embankment was built up to an average height of 24 feet. In places it was as high as 32 feet above the natural ground. At the western end where higher ground is reached along Northwestern Boulevard, the levee is only about 5 to 6 feet high. At one point where the levee crosses the street it is only 2 feet high, since the elevation of the pavement is 1 foot higher than the record 1937 flood. Actually the levee stops at the street pavement and begins on the other side. A sandbag closure will fill in the gap should the need ever arise. After the levee crosses the 30-foot bituminous pavement, it continues down the south side of the street between a double row of trees set about 35 feet apart.

Building the Embankment

The dirt was excavated from the borrow pits and placed in the embankment in 6-inch layers by a fleet of ten Koehring Wheelers, self-propelled earth-movers with a capacity of 13 struck yards each. A couple of Allis-Chalmers HD-14 pushers helped in the pits with the loading. When necessary the ground surface in the borrow pits was first loosened by a LaPlant-Choate ripper. On the embankment the material was spread out by a couple of Caterpillar dozers, a D8 and a D7, and shaped by an Adams motor grader.

If the material was too wet when it was placed, the grader kept turning it over, aerating it until it dried out enough to be rolled. If too dry, water was added from a 1,500 and a 1,000-gallon tank equipped with 8-foot lengths of perforated 3-inch pipe as spray bars at the rear. They were filled from the Ohio by means of a 4-inch pump.

As each 6-inch lift was placed, it was compacted by six passes of a sheepfoot roller in order to get the required 95 per cent maximum density at optimum moisture. Field tests were frequently taken, and if the desired results had not been obtained the fill was rolled some more. The compaction was obtained with two sets of dual-drum sheepfoot rollers, one Blaw-Knox and one Le-Tourneau, pulled by an International I-9 and an Allis-Chalmers Model A, both rubber-tired tractors.

In the early stages of the job, in a single 10-hour shift, the contractor moved an average of 3,500 cubic yards



C. & E. M. Photo

A Koehring Wheeler unloads over the base of the new Louisville levee which is under construction. In the background is the K. & I. T. RR bridge over the Ohio River.

of material with this equipment. The average haul was 1,000 feet, but a maximum of 2,000 feet was often reached. Later he brought onto the job six 15-cubic-yard Euclids and a 32-cubic-yard-per-minute Euclid loader. On August 21 the equipment was put into use on the levee embankment. The Koehring Wheelers were then used

solely for stripping operations. Subsequently two additional Euclids were bought and put into use on the embankment also.

The contractor ultimately, with the use of this Euclid equipment, attained records of 6,000 cubic yards of fill placed per 8-hour shift and 15,000 cubic yards placed per day. Light for after-dark

work was provided by four Onan 5-kw light plants.

The equipment ran on Texaco fuel, which was brought out to the units in the field in a 700-gallon tank truck. The latter was filled from a 3,500-gallon storage tank at the contractor's yard. Field repairs were made whenever possible with a Hobart 300-amp electric welder. Another key maintenance unit was a winch truck which had an A-frame at the rear and was equipped with a Weaver 3-ton hoist.

During the hot summer days, fresh, iced, drinking water was constantly supplied to the men by a horse and wagon which kept moving over the job. The wagon carried a barrel of water which was encased in a box of sawdust to keep it cold. The spigot on the barrel was equipped with a filter. The water was dispensed in a sanitary manner with Lily-Tulip paper cups. The remarkable feature of this system was the placidity of the horse as he plodded

(Continued on next page)

VIBER INTERCHANGEABILITY

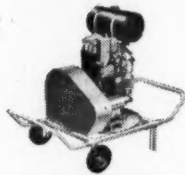
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The standardized line of **VIBER** Vibrators is a complete combination of interchangeable units readily adaptable to all types of concrete construction. Varying job requirements are easily met by a rapid change of vibrator heads or length of flexible drive, eliminating on-the-job delays and the necessity of purchasing excessive equipment. In the development of **VIBER** Vibrators every consideration has been given to employing the best method for concrete compaction while reducing construction time and concrete placing costs for the contractor.

The three illustrations to the right are typical combinations of **VIBER**'S interchangeable units.

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FLEXIBLE DRIVESHAFT
6', 12' and 21' lengths

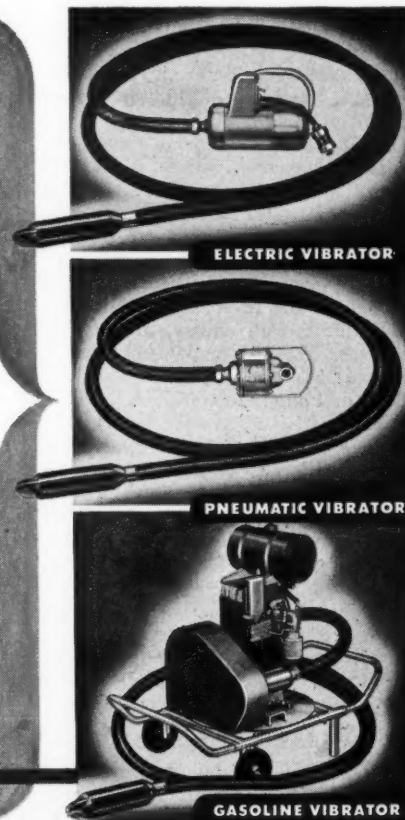


VIBRATOR HEADS
1 1/4", 2 1/4" and 3" diameter

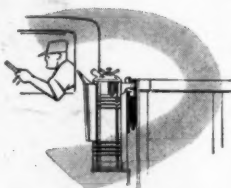


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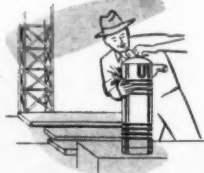
The **Dobbins Portable Sanitary Drinking Fountain** assures an adequate supply of pure, cool drinking water for construction workers, road and bridge gangs, maintenance crews, oil field workers, stevedores, locomotive engineers, section hands, etc. In factory or field, your workmen's health is protected... they are kept on the job. Fountain has inner water container of stainless steel. It operates like any bubbler drinking fountain, at the press of a button. Banishes germ-spreading cups, dip-pers and pails. Four-gallon tank is fully insulated. Air pressure for instant flow of water is provided with a few strokes of pump.

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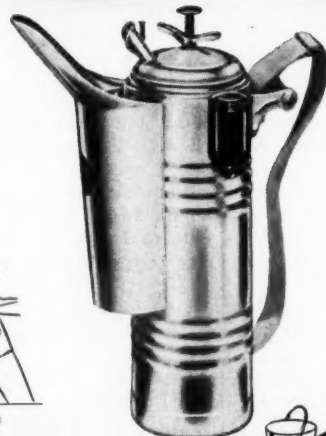
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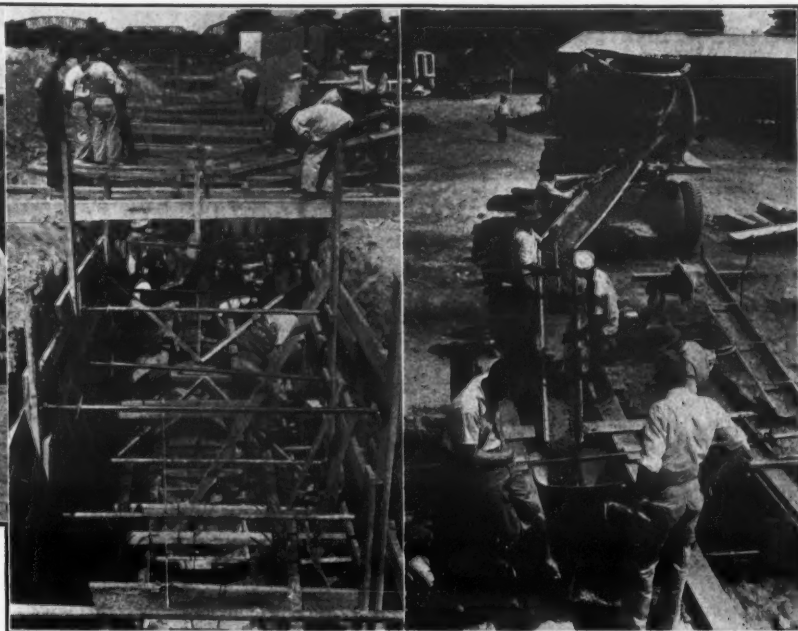


Dobbins
Superbilt
PORTABLE DRINKING FOUNTAIN



C. & E. M. Photos

Unruffled by the heavy equipment swarming all over the Louisville levee job, the placid horse shown in the first photo pulled a water wagon around to the men during the hot summer. The other two photos show work in the 51-inch monolithic sewer which Terry & Steadman placed—in the first, bracing and form work; and in the second, concrete being chuted into a hopper and thence into the forms from a Rex 3-yard truck-mixer on a Mack truck.



over the embankment with Koehring Wheelers and Euclids snorting and thundering around him on all sides.

Drainage Pipe

As soon as work started on placing the nearly 660,000 cubic yards of embankment, the contractor also began operations on the drainage structures. The entire sewer system in this area had to be redesigned and rebuilt. The existing pipes could no longer be permitted to flow under the levee and empty into the river. For in case of high water the Ohio would simply back up the pipes and flood the land behind the levee. Large new sewers of reinforced concrete have been built in 25-foot monoliths to replace the original lines. The new sewers range in size from 8-inch to 138-inch. In the largest size the walls are 18 inches thick and the invert is 20 inches.

These large structures are poured in two lifts: first the invert and then the remaining upper section. They are keyed together with tongue-and-groove joints. The new drainage design calls for a pumping station to be constructed later at 34th Street which will expel the internal drainage via a pipe either over or through the levee. The only opening in the levee will be a combination traffic opening and closure structure at Jewell Avenue, 23 feet 10 inches wide. This includes a storage vault to house the aluminum gate plate which can easily be slipped into the opening during high water.

The longest line of the concrete structures is a 51-inch monolithic concrete sewer that stretches for 650 feet behind part of the levee to replace the storm sewer that formerly ran under Rudd Avenue, now crossed by the levee. In this sewer the walls are 10½ inches thick.

Trenching and Concreting

To construct the 51-inch sewer, the ¾-yard Pullshovel dug a trench 8½ feet wide to an average depth of 12 feet. Only 150 feet of excavation was opened at a time so that the sides could be shored up as fast as the trench was dug. Three equally spaced 2 x 10's were placed in horizontal rows down each side of the trench, and supported by a vertical 2 x 10 every 8 feet. These vertical timbers were held in place by two Simplex 1½-inch trench jacks, one across the bottom and the other across the top of the cut. With this double bracing every 8 feet no trouble was experienced from cave-ins.

The invert was placed first without the use of a bottom form; the concrete was laid on the bottom of the trench. Then the upper section or arch was poured next. All concreting was done in alternate monoliths of 25 feet. The bottom jack was removed after the in-

(Concluded on next page)

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Hypressure JENNY's highly atomized mixture of steam, hot water and cleaning compound, applied under pressure through a spray-nozzle, instantly loosens and flushes away accumulated deposits of mud, dirt and grease from all types of machinery and equipment. And JENNY does it 8 to 10 times faster than by hand methods. Cleaning machinery with Hypressure JENNY before repairs, will save up to 40% of your mechanics' time which would otherwise be lost wiping dirt and grease from tools and equipment.

The following are typical savings JENNY is effecting: for hundreds of enthusiastic users*:

"We save \$25.00 on each piece of equipment we clean with Hypressure JENNY."

"It formerly required from 6 to 10 days with 2 men using scrapers and gas brushes to clean one machine. With Hypressure JENNY one man does a better job in 4 to 6 hours."

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Hypressure JENNY is a sturdy, compact, portable unit easily transferred from one cleaning job to another. Oil-fired or gas-fired models are optional; and the only requirements for operation are an electric current outlet and a hose connection to water supply. JENNY is economical, and so safe and easy to use that ordinary labor can operate it.

Write for illustrated folder and complete information on how Hypressure JENNY can save you time and money. There is no obligation.

* Names on request.

HYPRESSURE JENNY DIVISION
Homestead Valve Manufacturing Company
P. O. Box 30 • Coraopolis, Pa.

Levee Constructed To Safeguard City

(Continued from preceding page)

vert was poured, the vertical 2 x 10's being supported at the bottom by blocks bearing against the concrete. Then the arch forms were constructed.

They consisted of ¾-inch lagging running lengthwise of the trench in 8-foot sections. These were held together with 2 x 10 ribs on 16-inch centers. The seven sets of ribs were cut to fit the shape of the arch. Four of these 8-foot sections were used on a 25-foot monolith, since there was some overlapping at the ends. Naturally the arch forms could not be built in one complete section since an opening had to be left in the top for admitting the concrete. The two sections were fastened at the bottom to the side forms, and were secured on top by nailing a 2 x 6 across every 3 feet.

Plant-mixed concrete was supplied by the Concrete Supply Co. of Louisville, a 4-mile haul from the job site which usually took about 20 minutes. The concrete was agitated during this period on the way to the job. Three-yard batches were employed, and these were hauled and agitated in Rex truck-mixers mounted on Mack trucks. Across the trench two sets of double 2 x 10's were laid flat to support each hopper—three hoppers were usually employed during a placement. The concrete was chuted from the truck-mixer into the hopper and then down an elephant-trunk pipe into the forms. As it was placed it was vibrated by a Jackson hydraulic vibrator. Air-entraining cement was used to give greater plasticity to the concrete, and to make its placement easier in the constricted form space well occupied with reinforcing steel.

Two truck-mixers were generally sufficient to handle the average pour since it took about 30 minutes to unload a 3-yard batch, and a truck could make a round trip in 40 minutes. In a 25-foot monolith of this 51-inch sewer, the invert took 5.4 yards, while the arch required 8.7 yards. The concrete was cured with wet burlap.

The Mix

The concrete mix was 5 bags to the yard with an estimate of 4½ per cent of air due to the air-entraining cement. Crushed gravel, ¾-inch size, was used for the coarse aggregate, and two different grades of sand, a coarse and an extra-fine, were employed as the fine aggregate. The sand was made up of

about 88 per cent coarse and 12 per cent extra-fine. In gradation, 68 per cent passed the No. 16 sieve, and 7½ per cent passed the No. 100.

The surface weights for a typical 1-cubic-yard batch were as follows:

Cement	470 lbs.
Fine sand	120 lbs.
Coarse sand	869 lbs.
Gravel	2,357 lbs.
Water	209 lbs.
Total	4,025 lbs.

In backfilling over the sewer the first 4 inches was done with hand tampers. Then the next 5 feet was handled by six pneumatic tampers powered by an Ingersoll-Rand 210-cfm air compressor. Only then was equipment permitted over the backfill. The same compaction was required there as on the levee embankment. The drainage work, and the earth-moving also, was slowed considerably by the abnormally wet spring weather.

Quantities and Personnel

The major items in the contract include the following:

Levee embankment	660,000 cu. yds.
Excavation, stripping	200,000 cu. yds.
Excavation, trench	10,800 cu. yds.
Concrete	577 cu. yds.
Reinforcing steel	57,270 lbs.
Monolithic sewer, 138-inch	165 lin. ft.
Monolithic sewer, 126-inch	158 lin. ft.
Monolithic sewer, 63-inch	146 lin. ft.
Monolithic sewer, 51-inch	650 lin. ft.
Monolithic sewer, 30-inch	38 lin. ft.
Sewer pipe, 12-inch, vitrified-clay or concrete	703 lin. ft.
Concrete, precast, 36-inch	850 lin. ft.
Corrugated metal, 24-inch	670 lin. ft.
Relief drain, 8-inch, vitrified-clay	6,450 lin. ft.
Gravel filter	1,970 cu. yds.
Riprap	13,160 cu. yds.
Gravel blanket	6,550 cu. yds.

A force of from 70 to 100 men was employed on the levee contract, under the direction of O. L. Jones, Superintendent, and L. H. Terry a member of the firm of Terry & Steadman, contractors for the project. For the U. S. Corps of Engineers, John H. Krema is Resident Engineer, and I. C. Uland is Project Engineer. The Louisville Engineer District is headed by Colonel B. B. Talley, District Engineer.

Thousands of European children are hungry. Help them by contributing to the U. N. Appeal for Children.

Flexible-Coupling Line

A catalog covering a line of roller-chain flexible couplings has been issued by Baldwin-Duckworth, Division of Chain Belt Co., 375 Plainfield St., Springfield 2, Mass. These couplings are made in five styles—Semi-Flex, Tru-Flex, Twin-Flex, compound, and floating-shaft. The catalog describes each of these, and points out specific uses.

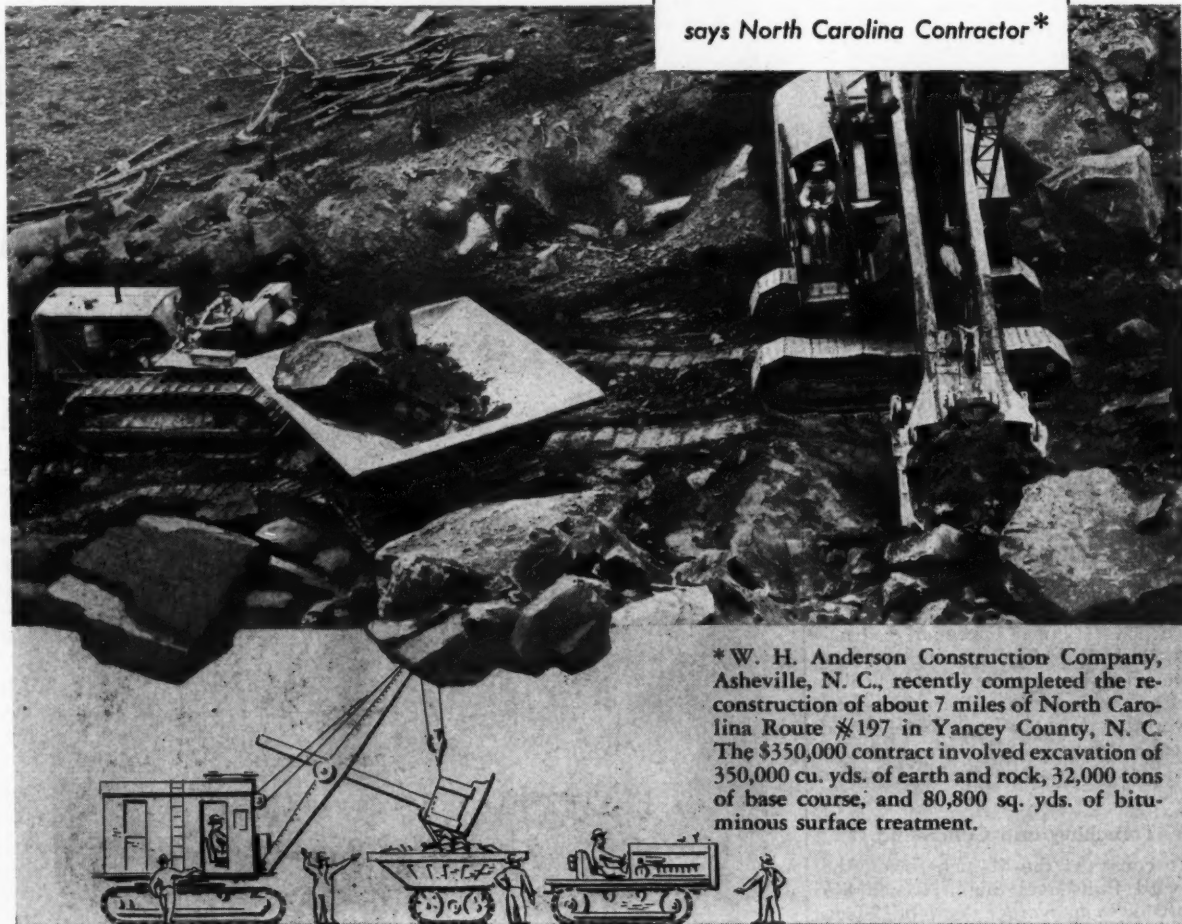
The catalog also discusses the several types of shaft misalignment and shows how the Baldwin Rex couplings are designed to compensate for them. These couplings are said to be flexible and shock-absorbing, to eliminate backlash, and to be easily installed. Tables provide complete information on dimensions, prices, and horsepower ratings for each unit in the line. Other engineering data listed in the catalog cover standard key sizes, standard bore tolerances; and service factors.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 53.

"Gulf Lubricants and Fuels

are a big help in beating contract schedules"—

says North Carolina Contractor*



*W. H. Anderson Construction Company, Asheville, N. C., recently completed the reconstruction of about 7 miles of North Carolina Route #197 in Yancey County, N. C. The \$350,000 contract involved excavation of 350,000 cu. yds. of earth and rock, 32,000 tons of base course, and 80,800 sq. yds. of bituminous surface treatment.

"WITH GULF LUBRICANTS AND FUELS, our equipment has given us outstanding service over a period of years," says this prominent North Carolina contractor. "On every job, we get the kind of lubrication and fuel performance that means smooth operation and freedom from mechanical delays—which add up to effective assistance in finishing ahead of schedule."

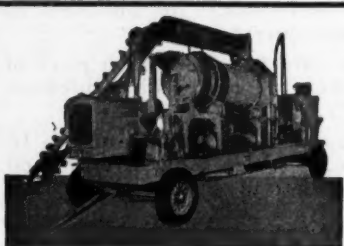
W. H. Anderson Construction Company is one of scores of leading contractors who have found that it pays to use Gulf lubricants and fuels on every job. Always of the same uniform high quality, Gulf products work as a team to keep equipment operating at maximum efficiency and at minimum expense for maintenance.

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FRONT END LOADERS

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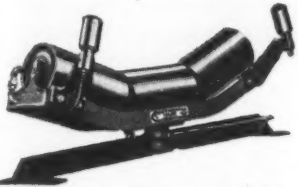
Gasoline Engine and Electric Motor Driven Models

Write for Circulars

White Mfg. Co.

ELKHART

INDIANA



The new Continental Gin Co. self-aligning idler for conveyor belts can be mounted without cutting into the deck plate.

Self-Aligning Idler

A self-aligning idler for belt conveyors has been developed by the Continental Gin Co., Industrial Division, Birmingham 2, Ala. It is made in designs suitable for troughed, flat, and return belts, and it is said to be interchangeable with most standard idlers.

Construction features include heavy-duty Timken bearings on the 1 1/4-inch swivel shaft; grease pipes extended to one side for improved lubricating ease; and hydraulic fittings as standard equipment, with others available if desired. According to the manufacturer, these idlers can be mounted without cutting into the deck plate.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

Hoists and Winches

A line of winches and hoists is made by the Rex Machine Co., 1152 Turner Ave., N. W., Grand Rapids, Mich. The Rex truck winch has a capacity of 5 tons and provides a gear ratio of 40 to 1. It is 36 inches long, 12 inches wide, 16 1/4 inches high, and rotates at a speed of 13 rpm. Power is obtained from a truck take-off.

The Rex industrial winch is rated at 5 tons, and features a turntable mounting which permits its use in pulling from an angle. A special reversing switch enables the winch to rotate in either direction. Power is obtained from a 3-hp electric motor mounted on the same base, and is transferred by means of two V-belts. The unit is 40 inches long, 16 1/4 inches high, and rotates at a speed of 13 rpm.

The Rex hoist is built to lift loads of 800 pounds, from 5 to 58 inches. It is 6 feet tall and has a 24 x 24-inch materials platform. The hoist is hand-operated using a Rex winch with 3/8-inch cable on a steel drum.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

Truck-Tire Carrier

A quick-change tire carrier, designed to permit handling of heavy truck tires by rolling rather than dragging, is announced by the Clark Bros. Mfg. Co., 144 W. Lake Ave., Watsonville, Calif. It is made in two sizes: the Model B-1 for 9:00 x 20 tires and larger; and the Model J-1 for 8:25 x 20 tires and smaller.

The Clark carrier can be used with trucks or trailers, and is mounted on the side or rear of the chassis by a special bracket secured by 1/2-inch bolts. In use, it is swung from under the chassis and tipped; then the tire, in a vertical position, is rolled off the carrier to where it is needed. This process is reversed for loading the carrier.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.

Catalogs on Power Lathes

Power lathes for use in repair and maintenance shops are discussed in literature available from The Sidney Machine Tool Co., Sidney, Ohio. This company makes lathes in a wide range of sizes and styles, including engine lathes, precision tool-room lathes, and gap lathes.

The literature points out advantages

claimed by Sidney for each of its lathes, as well as their complete specifications. Sectional photographs illustrate how these affect construction features, and text explains the operation of the lathes.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 33.

Folder on Dozing Work

A folder listing the features of the 180-hp Model C Tournadozer is being distributed by R. G. LeTourneau, Inc., Peoria 3, Ill. The folder features photos and diagrams which show how this piece of equipment can be used to speed up dozer work.

Form No. TD-118 discusses the production figures gained through the use of this rubber-tired unit, and compares its speed to that of other types of dozing equipment. Also listed are its major specifications and capacities.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 104.

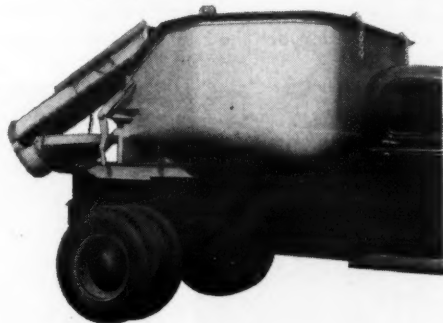


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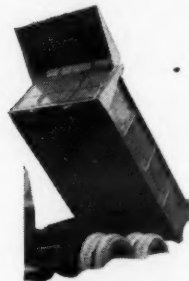
VICTOR EQUIPMENT COMPANY 844 FOLSOM STREET, SAN FRANCISCO 7, CALIF.



Hercules WD-12 Dump Body, equipped with Hercules 7X "Center-Lift" Hoist. Note integrated underbody construction, with crossmembers and longitudinals welded into a single, exceptionally sturdy unit.



The Hercules Aircrater, revolutionary new unit for hauling and placing premium-quality, air-entrained concrete, is equipped with a Hercules 8X "Center-Lift" Hydraulic Hoist for fast, clean dumping of concrete.



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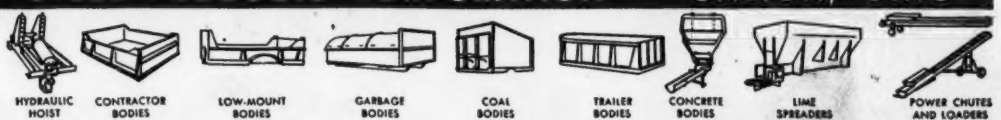
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Construction Costs, Present and Future

Construction-Cost Rise Not Out of Line Compared With Other Rises in 1947; Competition Far From Dead

By CHARLES M. NOBLE, State Highway Engineer, New Jersey State Highway Department

† CURRENT cost and price structures in highway construction are up! But the question is, how much are they up in comparison with commodities and other services in America today?

It is common knowledge that the cost of everything from shoes to bridges is alarmingly high in comparison with the 1940 price level. And this has led many highway departments to the policy of undertaking only those construction projects which are urgently needed to preserve the economic welfare of the state, to reduce highway accidents, and to relieve intolerable traffic congestion. That is to say, only those projects are undertaken which can show savings to the traveling public, to agriculture, business, and industry, in spite of the present-day high cost of the facility.

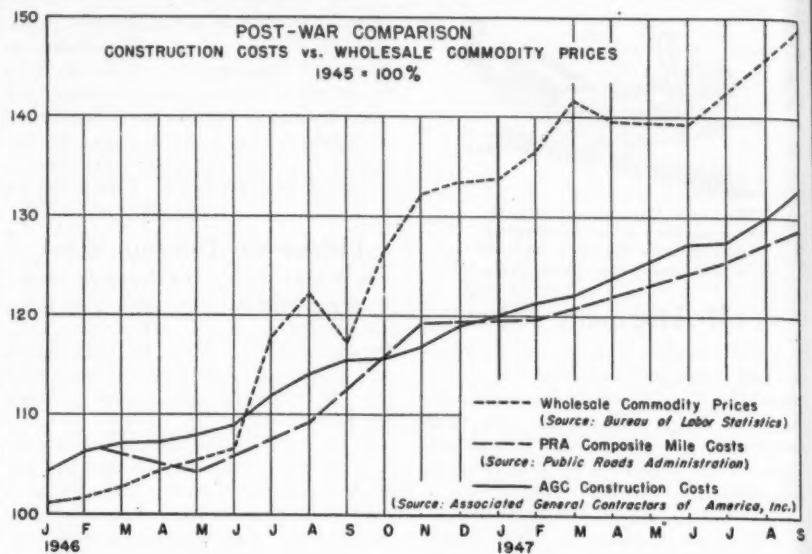
Construction Costs, 1940 vs. 1947

To obtain a perspective on the cost of commodities today compared with the 1940 level, let us look at retail food prices in New Jersey. The index has risen from 100 points to 220 points since 1940. Yet construction and building-cost indices show a smaller rise—from 100 to 185 points since 1940.

It is true that if we compare weighted average bid prices of various major items occurring in highway construction in New Jersey between 1940 and 1947, we find the percentage of increase varying from 84 to 260 for the various items. However, the use of these figures as a basis for judging the fairness of individual prices would be most misleading. Investigation reveals that most of the projects undertaken in 1940 were of rural character and not unduly complicated by traffic congestion and the necessity of working in busy built-up areas. On the other hand, most of the projects undertaken in 1947 were in congested urban areas and in many

cases involved working under heavy traffic.

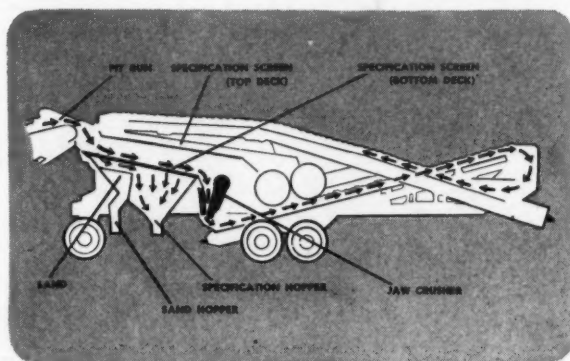
This indicates that we must be cautious about comparing 1940 and 1947 figures. Job conditions on each particular project must be analyzed and the weighted 1940 prices adjusted to reflect comparable job working conditions. Often it is found that in addition to traffic and urban congestion, physical conditions frequently present unusual and difficult problems which slow down production and increase costs. High ground-water table is a case in point. More stringent design and specifications have caused an increase in costs in some instances. These conditions may not have been present in the 1940 job, and we must take them into account when reviewing prices so that we can



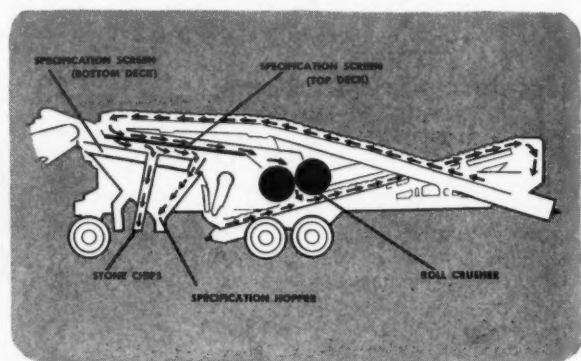
obtain a truly comparable picture.

In New Jersey such a comparative job-cost analysis indicates that current

state highway construction costs as a whole range from 65 per cent to 84 per (Continued on next page)



1 PIT RUN is fed to bottom deck of 3½ deck screen, eliminating scalping screen. Sand is rejected by half deck. Throughs go to pay hopper, they never reach a crusher. Oversize goes to jaw crusher where "force-feed" increases production.

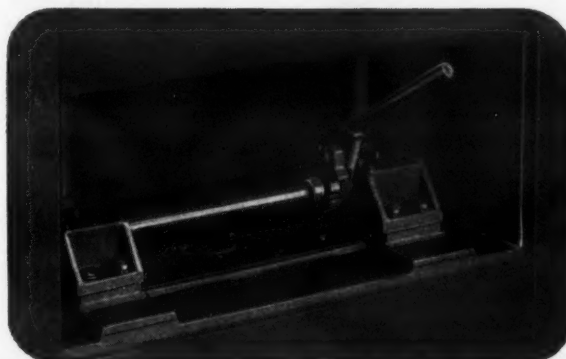


2 ONLY CRUSHED ROCK is screened by top deck. Specification material is chuted around bottom deck—not through it. Top deck produces independently from bottom deck doubling the effective screening area. Stone chips can be produced without extra equipment.

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- **MORE CRUSHING CAPACITY** because the load can be balanced between the crushers without stopping the plant.

*Exclusive with Pioneer Duplex Gravel Plants.



3 THIS SIMPLE RATCHET on the jaw crusher balances the load between the two crushers while the plant is operating. It is not necessary to change screens. When material is coarse, the jaw is opened. If pit run is fine, the jaw is closed.



4 PIONEER MAKES FOUR SIZES of duplex gravel plants with bottom deck feed. This Diesel-Electric Plant is the fifth bottom deck feed plant owned and operated by Winston Brothers. A new booklet tells all about bottom deck feed. Send for it today!

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Union Rules and Cost Increases

Shortages Another Cause

Shortage of construction equipment has caused contractors to hold on to over-age units with resultant breakdowns and job disruption. Spare parts have been in short supply; as a result, breakdown periods have been longer and the cost of repairs greater. The

What of the Future?

There is some body of opinion which indicates that construction costs may go somewhat higher in 1948, possibly as much as 10 per cent. But there are some favorable signs of a better outlook ahead. They indicate that by the end of the year stabilizing forces should be at work sufficiently to halt the upward climb of prices—provided European aid does not disrupt the availability of do-

Short of a major and long depression, American labor will probably not relinquish any of the gains made in wage rates. But it is possible that the workman will give a better account of himself, and that labor leadership may find it to the interest of the working man to ease the burden of unnecessary supernumeraries, and thus effect real savings in labor. In my opinion, the workman

On the other hand, it is believed that the major reduction in construction costs must be brought about by improved job organization, efficiency, advanced job methods, and the development and intelligent use of improved construction machines and labor-saving devices which will turn out more pro-

(Concluded on next page)

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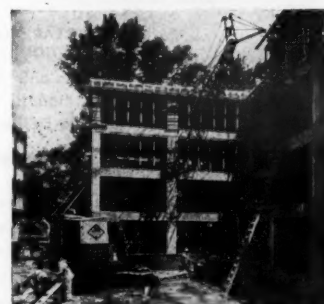
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Construction Costs, Present and Future

(Continued from preceding page)

duction per man-hour of labor. It is encouraging to note that new equipment models will reach the market this year, and an acceleration in the development of labor-saving equipment—particularly in the small-tool field—is taking place.

Competitive Spirit Not Dead

There is evidence that the old-time independence, individuality, and trail-blazing competitive and aggressive spirit of the American contractor is not dead. Cost-plus-a-fixed-fee has not quite killed him off. This old-time spirit will reassert itself and we shall see contractors starting to go places before long. When they get in there "pitching", costs are bound to fall.

The answer to the problem of high construction prices is this competitive spirit among contractors, this ingenuity, this progressiveness and aggressiveness in analyzing job schedules and organization, planning the job, and in devising new methods of getting more done for less money. Great responsibility rests also on the manufacturers of construction equipment. They must meet the challenge of devising new workable labor-saving machines and improving existing equipment for greater productive capacity, efficiency, dependability, and flexibility of operation under varying and adverse conditions.

I have faith that the American contractor and the construction-equipment industry will meet this challenge and avoid pricing construction out of the market. But they must be given the opportunity and a reasonable time in which to do so.

If construction costs are to be lowered, it is my opinion that highway officials also have a responsibility. They must provide enough work to enable the construction and equipment industries to gear up to the job ahead by building and training organizations disrupted by the war, developing better methods, and producing more and better machines so that the job of rebuilding America may proceed efficiently and with economy.

From a paper presented at the Annual Convention of the Association of Highway Officials of the North Atlantic States, March 3-5.

Line of Hose Clamps

A line of hose clamps is manufactured by J. R. Clancy, Inc., 1010 W. Belden Ave., Syracuse, N. Y. The Sure-Grip clamps are made from heavy steel. They are galvanized at the conclusion of manufacturing operations to eliminate raw edges, and to protect the edges against rust and corrosion.

The manufacturer states that the Sure-Grip clamps will support and grip the hose at every point, and that they will maintain a perfect circular shape at every point and stage of tightening. The entire line consists of over 100 styles and sizes to meet a wide variety of hose applications.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 89.

Ties for Reinforcing Bars

A folder which describes the features of its wire ties for reinforcing bars can be secured from the Bates Wire Tie Division of the St. Regis Sales Corp., 2910 E. 75th St., Cleveland 4, Ohio. These ties have loops on each end which are placed around the intersection of the bars to be tied. A hook is then inserted in these two loops and twisted to make a uniformly tight tie.

The catalog lists the tie sizes to be used in combination with the various-sized reinforcing bars—either round or square. It also describes the special

Bates tools which have been developed to speed up the twisting of the ties. These are made in three styles: a pistol-grip style with a hook which engages the loops while the hand gives a twisting motion; a spiral type which twists the loops as the handle is withdrawn; and a spring-return model which twists the loops and automatically returns to its original position.

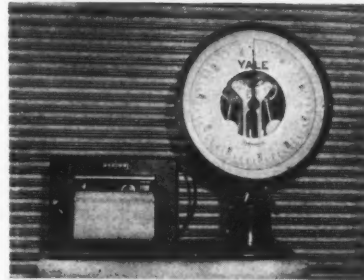
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 76.

Stud-Welding Firm Bought

The assets and patent rights of the Nelson Stud Welding Corp., of Lorain, Ohio, have been purchased by the recently formed Morton-Gregory Corp., Manhattan Bldg., Toledo, Ohio, manufacturer of specialty electrical equipment. All of the Nelson manufacturing and engineering activities will be centralized at the Lorain, Ohio, plant, and will be known as the Nelson Stud Welding Division of Morton-Gregory Corp.

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Look At These Advance-Design Features!

NEW CHEVROLET 4-SPEED SYNCHRO-MESH TRUCK TRANSMISSION

A special feature in heavy-duty models that assures new operating ease and efficiency.

SPLINED REAR HUB CONNECTION

Greater strength and durability in heavy-duty models with this exclusive Advance-Design feature.

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A steering column gearshift in models with 3-speed transmissions provides greater driving ease and convenience.

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A feature that offers new clear floor area, safety and efficiency in models with 3-speed transmissions.

THE CAB THAT "BREATHES"

Fresh air—is drawn in and used air forced out! Heated in cold weather.

IMPROVED VALVE-IN-HEAD ENGINE

The world's most economical engine for its size now has greater durability and operating efficiency.

PLUS Uniweld, all-steel cab construction • New, heavier springs • Full-floating hypoid rear axles • Specially designed brakes and Hydrovac Power brakes in heavy-duty models • Ball-bearing steering • Double-line pre-selective power shift with 2-speed axle at extra cost • Wide base wheels • Standard cab-to-axle-length dimensions • Multiple color options.

*Fresh air heating and ventilating system optional at extra cost.

CHEVROLET TRUCKS



C. & E. M. Photos

A rain-flooded creek breaks through Georgia State Route 64 near Glennville (left). Above, Resident Engineer R. E. Carswell points to a side drain now exposed where the flood has washed the road away. Wyatt L. Wilson, Resident Engineer for bridge work, looks on.

Job and Contractors Washed Out by Rains

Last April, spring rains breaking a 75-year record shut down the work of three contractors on State Route 64 in Georgia. The road is under contract from Glennville to Baxley, and the work includes a bridge over the Altamaha River. The three Georgia contractors are Wright Construction Co. of Columbus, Scott Construction Co. of Thomasville, and H. M. Pafford, Jr., of Waycross.

The three companies moved in to start work in February, but couldn't proceed because of winter and spring rains. They were about to get going at last, when heavy rains on March 31 and April 1 completely washed out the location and made it inaccessible. The accompanying photos were taken by our Eastern Editor, William H. Quirk, on April 5, about 2 miles from the Altamaha River—the closest anyone could get over the washed-out road.

Data on Emulsified Asphalt

Several applications for its emulsified asphalt are described in a bulletin being distributed by the Bitucote Products Co., 1411 Central Industrial Drive, St. Louis 10, Mo. Feature of the catalog is the large number of pictures showing the many uses to which Bitucote can be put.

The bulletin lists several of the advantages claimed for this product. It also describes the five general methods for using it—penetration, road-mix, plant-mix, surface treatment, and base stabilization.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 65.

Thor in New Headquarters

A new administration building adjacent to its main works at Aurora, Ill., has been opened by the Independent Pneumatic Tool Co., maker of the Thor line of tools and equipment. The Chicago sales branch will remain at 600 W. Jackson Blvd. until a new office building is completed in the autumn.



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Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

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The T. L. Smith Company
Milwaukee, Wis.

The Knickerbocker Co.
Jackson, Mich.

Wire Mats Check Erosion on Fills

Mountain Fill Slopes Reinforced by Special Mats, Seeding, Straw Protection, and Willows

WHEN highway engineers of the California Department of Public Works designed the new mountain highway up City Creek Canyon towards the mountain resorts near San Bernardino, one of the serious problems they had to solve was surface erosion on the sides of high fills. One of the jobs, 4.36 miles long, took 655,200 cubic yards of excavation. And fill slopes up to 240 feet long, on a 1½ to 1 ratio, were subject to severe erosion during the heavy rainfall of the winter season.

While much of the grading passed through rocky mountainous country, the fills contained a great deal of sand, decomposed granite, and soil highly vulnerable to surface erosion from rains. In order to hold these slopes where the construction forces placed them, erosion protection was specified in the contract plans.

This protection consisted of special wire mats fabricated in the field, a few brush mats, compacted straw mulches, and seeding. Near the lower end of the canyon, where the new road begins its climb, some corrugated-metal retaining walls were also installed.

Typical of this special protection was the 4.36-mile \$745,000 contract which

was done by the Sacramento contracting firm of Westbrook & Pope, Inc. This contract called for grading, erosion protection, bridges and drain structures, and surfacing.

Erosion Measures Stressed

Erosion-prevention measures, stressed in the plans and specifications, called for wire mats at 10-foot elevation intervals for the first 50 feet of fill; for mats on 15-foot elevation intervals from that point on up to the top. These mats consisted of two courses of 2 x 2 wire-mesh fencing 58 inches wide, with two double courses of 36-inch war-surplus camouflage wire sandwiched in between.

They were laid flat on the ground as the fills were built, with the outer edge at least 6 inches inside the fill.

Seeding, the application of straw mulch, and special compacting were performed by the contractor. Willow cuttings were planted by state highway maintenance forces, as incorporated in the specifications.

Work Methods

The war-surplus camouflage wire had been purchased by the State Division of Highways and was furnished to the contractor free of charge. This material, together with rolls of 58-inch fence wire, was hauled to the job by a GMC truck.

The bottom course of wire was then unrolled by a 3-man crew. Ends of this wire were carried about 20 feet outside the fill abutments. The war-surplus camouflage wire was then put down, another course of fencing wire laid on top, and the mat was complete. The ends of the mat were then pegged down with wood stakes. The mats were put



C. & E. M. Photo
A sheepfoot roller and a Caterpillar-drawn LeTourneau Carryall build up a fill on the City Creek Canyon mountain road. Meanwhile surveyors stake out wire mats to prevent slope erosion.

down so rapidly that there was never any delay to tractor-drawn scrapers and a sheepfoot roller which built the fills.

On the first contract of the City Creek Canyon road, west of this job, small brush was used as a filler between the two fence-wire courses. It required a little more time to put in. Moreover, brush was hard to find, and a bigger crew was necessary to cut and handle this material. Highway Division representatives regard the use of the present type of mat as superior to brush-filler.

As the mats were completed, earth-moving equipment brought the fills up in 6-inch lifts. When another 10 or 15 feet of fill had been finished, depending on the overall height, another mat was installed. Slopes were built to somewhat higher standards of accuracy than is customary in mountain-highway fills, because of the installation of these mats.

As soon as a fill had been finished, its side slope was seeded by hand, using 200 pounds of mixed seed per acre. This
(Concluded on next page)

First Step toward Bigger Profits



Read how breaking two walnuts can start you on the road to increased profits.

Tie one of them on a string and whirl it sharply against a hard surface. See how easily it breaks... how uniform the pieces are. That's because the breaking force was evenly distributed. This walnut was broken by impact.

Now crush the other with a pair of pliers. Much greater effort is needed. The force is concentrated on one small area which is pulverized too fine for use. The ends of the nut remain in comparatively large, irregular pieces. More power succeeds only in producing an undesirable product.

New Holland Double Impeller Breakers use impact breaking in its most efficient form. They can reduce stone to a uniform, cubical product as small as minus 1", in one fast, economical operation.

Get full information about the breakers that produce a more saleable product with less power per ton. Write today for New Holland's illustrated catalog on Double Impeller Breakers. In the meantime, ask your dealer for a showing of "The New Stone Age", a sound and color movie. See and hear the complete story of Breakers that produce more for bigger profits.

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The Old Way The DI-MET way



FELKER DI-MET Heavy Duty CONCRETE CUTTER

- FEATURES:**
- MORE POWER**—2 cyl. 10 h. p. engine.
 - DOUBLE END SPINDLE**—Right or left-hand operation.
 - POSITIVE WATER CONTROL**—Protects diamond blade by flooding as blade is lowered.
 - PERFECT BALANCE**—Handles easily on front or rear wheels for quick maneuvering.
 - CUTS UP TO 6½" DEEP**—with 18" maximum blade size.
 - PRECISION ENGINEERED and BUILT** by DI-MET to assure maximum life and performance from DI-MET Segmented Type Diamond Wheels!



DI-MET Segmented Type Diamond Wheel made especially for cutting concrete. Costs less, lasts longer, cuts faster!

- ADVANTAGES:**
- Straight, true edges when trenching concrete.
 - 40-50% less breaking-out time.
 - 60% overall saving in labor and materials.
 - Cleaner, neater, longer-lasting patches.



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C. & E. M. Photo
A surveyor measures a high fill slope on the City Creek Canyon highway, preparatory to setting another wire mat to check erosion. Each stake represents a mat location.

seed mixture contained 50 per cent barley, 45 per cent rye grain, 3 per cent alfalfa, and 2 per cent mustard.

Specifications then required 3 tons of rice, wheat, barley or oat-straw mulch per acre. It was purchased locally, hauled by truck to the job, and distributed over the seeded slopes. Special compaction was then performed to build up the density of the slopes, and also to seat the mulch in the soil.

A standard two-drum sheepfoot roller, with tapering spike teeth, was used. Since so many of the slopes were steep and high, it was necessary to pull and lower the roller from the top of the finished roadway. A P&H truck

crane was used for this work, with the sheepfoot roller attached to the drag cable of the machine. Six passes were made before the machine moved ahead the width of the roller.

When Westbrook & Pope had finished this part of the work, state highway maintenance crews brought truckloads of water-willow cuttings from the Santa Ana River valley and planted them by sticking them in the ground. These willows soon take root and grow. With a few winter rains on the lower end of the project, willow cuttings and seeded areas were coming up nicely, and the tamped straw mulch was thus far quite successful. Erosion was negligible.

According to the engineers in charge, the wire mats and surface protection are good insurance at nominal cost that steep mountain fill slopes can be made to stand up even in material that is highly vulnerable to erosion.

Oliver Pope was the General Superintendent for the contractor. E. Q. Sullivan was District Engineer for the California Division of Highways. Started last November, the big project is slated for completion by August 1, 1948.

Vibrating Screens Listed

A catalog on its complete line of vibrating screens can be obtained from the Universal Vibrating Screen Co., Deane Blvd. and St. Paul RR, Racine, Wis. These units are made in a wide range of sizes and styles for use with any size of aggregate, either wet or dry.

Catalog No. 107 illustrates each of the models, listing its principal features and the sizes in which it is made. With each model there is a description of its construction and applications. This 32-page booklet also explains the twelve advan-



C. & E. M. Photo

The wire mats used to prevent erosion on fill slopes of California's mountain highway up City Creek Canyon consisted of two courses of wire-mesh fencing with two double courses of war-surplus camouflage wire sandwiched in between. The ends of the mat were pegged down with wooden stakes.

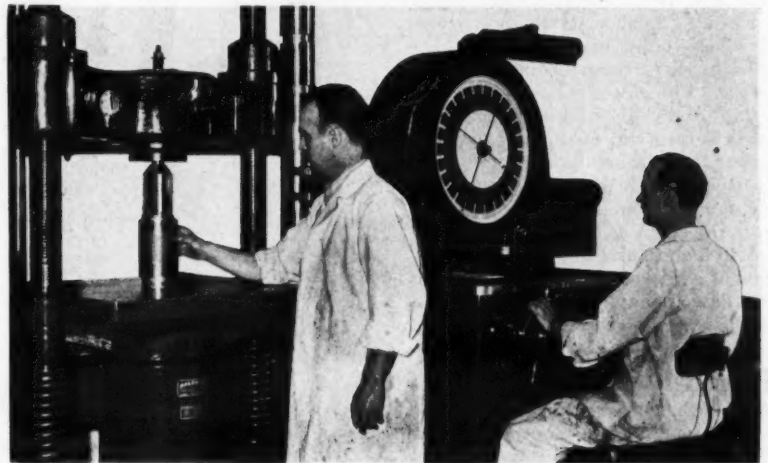
tages the company claims for its screens.

Component parts of these units are discussed in detail, as is the method of installation. Parts so described are the vibrating mechanism, the screen cloth and the method of mounting it, and the power and drive units.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 51.

Marion Representative

H. Wilson Hubert has been placed in charge of the Pittsburg, Kans., office of the Marion Power Shovel Co. As District Sales Representative, he is in charge of the territory comprising portions of Kansas, Missouri, Oklahoma, and Arkansas. He succeeds Ernest M. Peterson, who has resigned to join a coal company in Kentucky.



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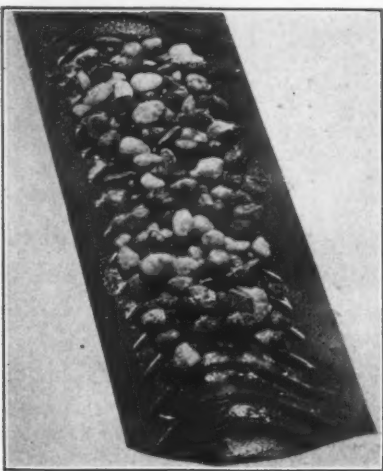
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See Pages 118, 119



Goodyear's new ribbed-top conveyor belt is shown here in a miniature model, undergoing laboratory tests. The curved ribs are designed to trap water and prevent backwash of sand and gravel, wet-mixed concrete, etc.

Ribbed Conveyor Belt Handles Wet Materials

A conveyor belt designed to prevent backslip while carrying wet materials up steep inclines has been developed by the Goodyear Tire & Rubber Co., Akron, Ohio. It features chevron-shaped ribs which serve as barriers to trap water and thus prevent backwash of materials down the belt.

The new Goodyear belt can be used with sand, gravel, wet-mixed concrete, and other soupy materials. It is designed to carry them up inclines of 20 degrees. The ribs are closely spaced to overlap each other and to assure a smooth return run of the belt over the idlers. The ribs are 1/4 inch high. The belt itself has a 5-ply rubberized fabric body, and a 1/4-inch top cover in addition to the ribs. It is made in widths of 30 to 48 inches, and in any length.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Earth-Moving Scoops

A line of earth-moving scrapers and scoops is made by the Southern Welding & Machine Co., P. O. Box 99, Charlottesville, Va. The Speed Scoop is made in two models having capacities of 1.6 and 4.1 cubic yards, heaped; or 1.4 and 3.5 cubic yards, struck measure. Features claimed for the unit include clean dumping, easy loading, and ample ground clearance.

The Model J-2 requires a drawbar pull of 20 hp, has a width of cut of 48 inches, and a depth of cut which varies from 0 to 7 inches. The bowl will rotate 115 degrees. Overall dimensions are 9 feet 5 inches long, 6 feet 8 inches wide, and 3 feet 8 inches high.

The Model K-2 requires a drawbar pull of 35 hp, has a width of cut of 60 inches, and a depth of cut which can be varied from 0 to 10 inches. The bowl will rotate 120 degrees. Overall dimensions are 10 feet 9 inches long, 8 feet 6 inches wide, and 5 feet 4 inches high.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

Carbide-Tipped Drill Bits

A catalog on its carbide-tipped drill bits has been prepared by the New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge 39, Mass. It features a description of the Cyclone brothers—the blue Cyclone hammer bit and the red Cyclone rotary bit. The blue Cyclone is designed for drilling in granite, hard brick, concrete, or other hard masonry materials. The red Cyclone is for drilling in brick, tile, and general masonry materials.

The catalog carries illustrations of each of these bits in use, and describes the differences in their construction. It gives the specifications and prices of

the various drill sizes, and the quantities in a standard package. Bulletin CB-48 also tells how to sharpen these drill bits.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 68.

Special Aggregate

Aggregate—its use and importance—is the subject of literature made available by the Walter Maguire Co., Inc., 330 W. 42nd St., New York 18, N. Y. This company is producer of emery aggregates for use in making Emery-Crete flooring.

The company's literature shows what emery aggregate is and lists advantages claimed for it. It describes how this material compares with other materials, what results are obtained by its use, and the physical characteristics of the finished flooring.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 59.

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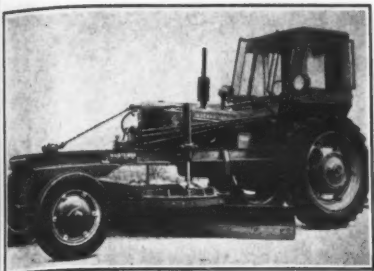
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The new Meili-Blumberg Model 30 hydraulically controlled power maintainer is built around a modified International Harvester 31.5-hp power unit.

New Power Maintainer

Production of a new-model power maintainer is announced by the Meili-Blumberg Corp., New Holstein, Wis. The company recommends it for construction and maintenance jobs requiring a lightweight grader. The Model No. 30 is hydraulically controlled and is built around a modified International Harvester 31.5-hp Model H power unit.

This maintainer features five forward speeds ranging from 2.5 to 15.7 mph, and one reverse speed. Blade clearance is 12 inches, and maximum blade pressure is said to be approximately 5,000 pounds. Attachments include leaning front wheels, power broom, V-type snow plow, bulldozer, scarifier, and fully enclosed cab with lights.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

Chloride Spreader

A spreader for use in distributing calcium chloride and similar materials is made by the Mount Vernon Implement Co., Inc., Mount Vernon, N. Y. It can also be used in roadside development, as it is suitable for use as a lime or fertilizer spreader. It is made in two widths: the Model S-204 is 8 feet wide, and the Model S-205 is 10 feet wide.

Among the features claimed for this spreader are uniform distribution, accurate quantity control, thorough expulsion, and ease of use. The single-lever control is designed to permit adjustment of the feed from both sections of the hopper at the same time. A positive-drive clutch allows engagement of the agitators during forward motion, and free-wheeling when backing or turning. The clutch may be disengaged when the unit is not spreading. The bottom of the hopper is rounded to permit a snug fit with the agitator blades.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 12.

Coated Salt Tablets

Enteric-coated salt tablets are made by the United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo. These Pep-Up tablets are said to prevent salt sickness or nausea caused by salt dissolving in the stomach.

The Pep-Up tablets are marketed in a container which also serves as a dispenser. These dispensers are factory-sealed to prevent tampering or contamination by handling of the salt tablets. The company is also prepared to provide an all-steel dispenser for outdoor use. The Perma-San dispenser acts as a protective jacket for the containers which fit inside it, and is so designed that the tablets never touch metal.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

Secondary Rock Plant

A new-model secondary rock-crushing and screening plant for the production of road rock has been added to its line by the Universal Engineering Corp., 620 C Ave., N. W., Cedar Rapids,

Iowa. It is made with three sizes of hammermills, in capacities ranging from 50 to 125 tons per hour.

The Model No. 1800 secondary stone plant consists of a Universal hammermill, double-deck vibrating screen, Rotovator, conveyors, hoppers, and necessary drives. The entire unit is mounted on a rubber-tired chassis. Power is applied to the side of the plant through a universal joint to a special roller-bearing-mounted back shaft.

Material received from a primary crusher is delivered directly to the screen. There, finished material is screened out and oversize is delivered to the hammermill. The output of the mill is returned to the main conveyor by means of an under conveyor and Rotovator wheel, and then back to

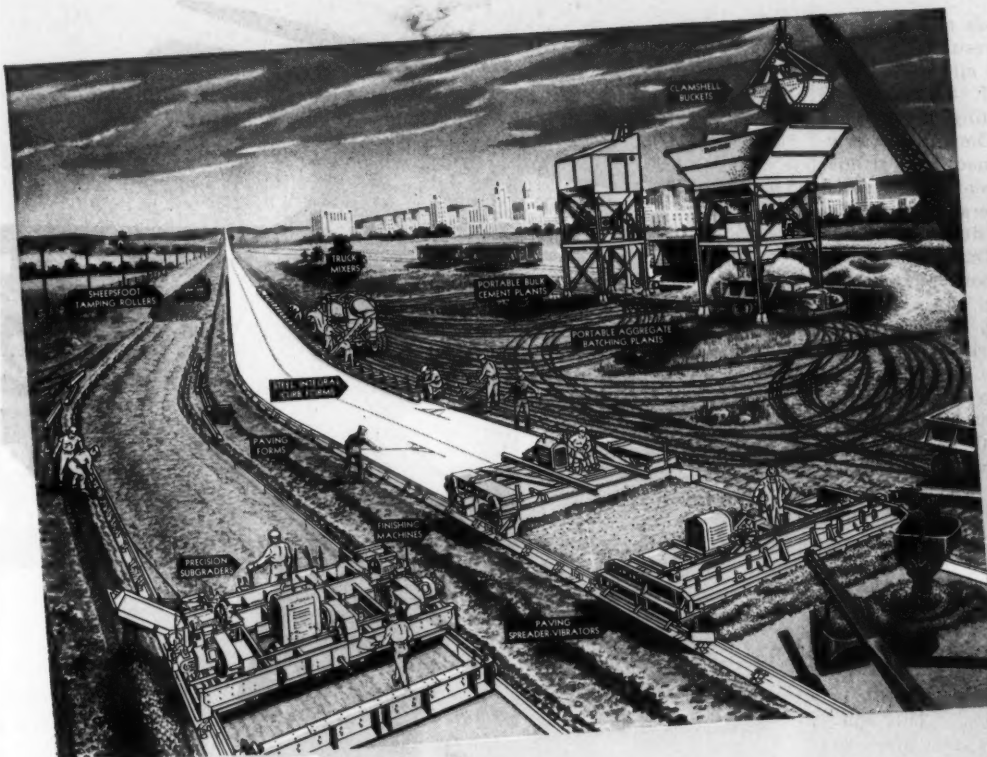


Universal's Model 1800 secondary rock plant is available with three hammermill sizes, in capacities from 50 to 125 tons per hour. It is mounted on a rubber-tired chassis.

the screen. Finished products are delivered to trucks or stockpiles by belt conveyors.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 41.

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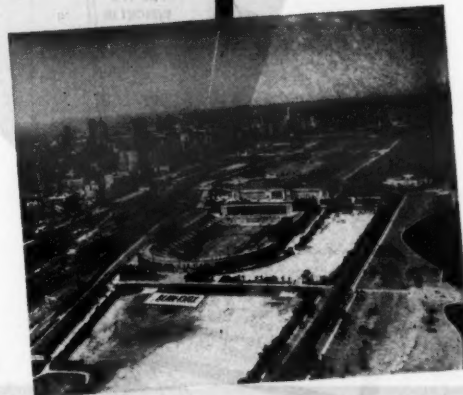
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Dam Diversion Tunnel Lined With Concrete

Invert Poured First, Then 13-Foot-Diameter Barrel; Concrete Pumped to Forms Through 8-Inch Pipe Line

THE major operation at the Union Village flood-control dam in Vermont during 1947, the second year of construction, was lining the diversion tunnel with concrete to a minimum 1-foot thickness. During the preceding year the 1,170-foot tunnel was bored through solid rock. (See C. & E. M., Dec., 1946, pg. 50). And a gate shaft 143 feet deep, intersecting the tunnel near its midpoint, was started in 1946 and completed in 1947. The 13-foot-inside-diameter passage, with a horseshoe-shaped cross section, will divert the Ompompanoosuc River so that work on the rolled earth-fill dam can be started this year. The project is scheduled for completion in 1949.

To help control floods on the Connecticut River, which result in damage to large New England cities along its lower reaches, the U. S. Corps of Engineers is constructing the Union Village Dam on the Ompompanoosuc River, one of the Connecticut's tributaries in eastern Vermont. The confluence of the two rivers is about 4½ miles below the dam site. The valley through which the Ompompanoosuc flows is narrow, and is bordered on each side by a rugged chain of rocky hills. The only possible way to divert the river safely—for it can rise to turbulent proportions with little warning—was through a tunnel. When completed, the dam itself will be 1,100 feet long and 170 feet high above the bed of the river. Its total volume will be 1,719,000 cubic yards; of these, 1,580,000 cubic yards will be earth fill and 139,000 cubic yards will be rock fill and riprap.

A contract for the dam and appurtenances was awarded to the Savin Construction Corp. of East Hartford, Conn., on its low bid of \$2,429,208.40. The tunnel and gate shaft in the hill on the left bank of the river, were dug by the Stiefel Construction Corp. of Milton, N. Y., under a subcontract. This subcontractor also installed steel lining in

the shaft to support the rock, which is jointed at frequent intervals in planes inclined at a small angle from the vertical and nearly parallel to the upstream and downstream faces of the shaft. This lining, which was furnished by the Commercial Shearing & Stamping Co. of Youngstown, Ohio, will be left in place and embedded in the permanent concrete shaft lining. The concrete lining in the tunnel and gate shaft is being done by the prime contractor.

Rock-Tunnel Invert

At the intersection of the shaft and the tunnel are gates for control of the river flow after the dam is built. The tunnel widens out around this point into two rectangular chambers, each 7½ feet wide x 12 feet high, in which the



C. & E. M. Photo
Concrete for the downstream half of the diversion tunnel at Union Village Dam was mixed in this MultiFoote 27-E paver set up outside the tunnel entrance. From there it was chuted down to a Rex Model 200 Pumpcrete machine at the right.

control gates are installed. The transition section is 82 feet long. The gates are controlled from an operating house

at the top of the shaft.

The first phase of concrete work in (Continued on next page)



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C. & E. M. Photo

This is the Mayo steel form built by the Lancaster Iron Works for the barrel of the diversion tunnel at Union Village Dam. Resident Engineer R. S. Johnson stands inside to show its size.

construction timetable, the contractor paced his organization of equipment and personnel smoothly over the construction season. Equipment shutdowns were kept to a minimum, while the average force of 50 to 60 construction workers was shifted from one phase of the work to another without loss of efficiency. The most difficult part of the job, and one which could not be overcome, was working in the limited quarters provided by a 13-foot-diameter tunnel. Handling the concrete equipment and placing the mix properly was always something of a problem in the narrow confines of the tube, particularly with the heavy reinforcing steel with which the concrete walls of 1-foot-minimum thickness were strengthened. The reinforcing consisted of $\frac{3}{4}$ -inch rods on 12-inch centers, and was supplied by the Sparrows Point, Md., plant of the Bethlehem Steel Co.

Concrete Operations

Concrete for the tunnel lining was mixed in a 27-E paver set up outside

the tunnel entrance. It was then discharged down a chute into the hopper of a Rex Model 200 Pumpcrete machine. From there it was pumped through an 8-inch pipe line, with a maximum length of 700 feet, and deposited in the forms. Two 27-E pavers were used, a Ransome on the upstream side and a MultiFoote on the downstream half of the tunnel. The work began at the shaft and progressed to-

wards the outside at both ends. This saved moving the pavers from one end of the tunnel to the other, and one was always on hand for a spare if the need should arise. The booms had been removed from both since they were unnecessary.

Not quite a third of the total 22,000 cubic yards of concrete included in the contract quantities was required

(Continued on next page)

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the tunnel consisted of pouring the invert, which extends across the floor and up the sides to a point 2 feet above the invert grade. The rocky bottom of the tunnel served for the outside form, while the inside form was of wood and was constructed on the job. The invert was poured in 30-foot-long sections. These are separated by an expansion joint which consists of copper water-stop crimped to accommodate a strip of $\frac{1}{4}$ -inch Elastite pre-molded filler. Alternate sections were poured initially, beginning at the upstream end of the transition section and working to the inlet end of the tunnel. Intermediate pours were made as soon thereafter as forms could be readied. That part of the job took from July 10 to August 5.

The side or curb forms for the invert were made of 2 x 10's running longitudinally down the tunnel, and hung from an intricate system of timber bracing. The bracing, in turn, was supported on double 2 x 8's along the sides of the tunnel and close to the wall. These stringers rested on sections of 2-inch pipe stuck into the rock floor about every 7 feet. On top of the pipe a bracket of either flat steel or a reinforcing bar was welded and shaped in the form of a U, into which the timbers fitted. Across these timber stringers, double 2 x 8's were stretched at 4-foot intervals to hold the side forms. The connections consisted of 2 x 6 knee braces. The bottom curve of the horseshoe was not formed, but was screeded to proper shape by hand.

On August 15, the first barrel section was poured on the upstream end, working out from the transition. By September 16 the upper half of the tunnel was finished. Invert form work was then prepared on the downstream half of the tunnel, and the first pour was made on October 2. By October 25 the invert downstream from the transition section was finished, permitting the barrel pours on the lower half of the tunnel to begin November 1. All typical tunnel lining was completed by November 23.

Concrete placement in the transition section was started on August 4 and completed early in March of this year. Concrete construction in this area was not adapted to rapid job operations because of the variations in dimensions through the transitions and the necessity for gearing the work to fit in with installation of the gate frames and conduit linings. Work was accordingly intermittent, sandwiched in with work on the typical tunnel lining and on the intake and outlet structures.

The intake structure, consisting of an approach section, trash-rack supports, and a bell-mouth tunnel entrance, was started on October 1 and completed on December 19. The outlet structure, a small stilling basin which consists of flaring wing walls and a flat apron with a raised sill at the downstream apron, was started on January 21 this year and was scheduled for completion in March.

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CASE



Dam Diversion Tunnel Lined With Concrete

(Continued from preceding page)

for the tunnel lining. The bulk of the concrete item will go into the 388-foot concrete spillway weir and an adjacent retaining wall, with only 7,000 yards needed for the tunnel. Another 3,300 cubic yards will be required to line the gate shaft and construct the basement of the operating house.

A batch plant was set up on the right bank of the river, across and downstream from the outlet end of the tunnel. To hold the aggregate, a Blaw-Knox 3-compartment bin was set up along a bank which had been excavated to a vertical face and supported with timber cribbing. From this advantageous position material was dumped directly into the bins from trucks on top of the hill, thus eliminating the need for a crane at that point.

Adjoining the plant is a sand and gravel pit where a Good Roads 12 x 26-inch crusher was set up to process the material to the sizes required in the mix. The coarse aggregate produced there was satisfactory for use in the concrete spillway, where possible deterioration from weathering could be tolerated. But it was not considered suitably resistant for use in the tunnel or shaft lining. The sand, passing the No. 4 screen, was approved for all types of concrete on the project. Accordingly, traprock for coarse aggregate for tunnel and shaft concrete was purchased from John S. Lane & Sons of Westfield, Mass. The stone was shipped by rail to the East Thetford, Vt., siding of the Boston & Maine Railroad, where it was unloaded by crane and hauled 10 miles by truck to the job.

For coarse aggregate in typical tunnel lining, the stone was graded from ¾-inch down to No. 4. Coarse aggregate for the heavier sections in the intake and outlet structures and in the transition consisted of 1½ to ¾-inch and ¾-inch to No. 4 sizes combined in equal proportions.

Stockpiles of aggregate were stored both near the crusher and on top of the hill near the plant. As required, the material was loaded by crane into trucks which kept the aggregate bins fully charged.

Material Handling

Dragon portland cement was purchased from the Lawrence Portland Cement Co. at Thomaston, Maine, and shipped in bulk cars to the B. & M. siding at Kendall Station, about 4½ miles from the job. It was unloaded and stored in a 200-barrel cement bin which adjoined the siding. From there it was drawn off as required and hauled in covered dump trucks to a 300-barrel storage bin next to the aggregate bin at the plant. Both cement bins were Blaw-Knox.

Two to four batch trucks, carrying two batches each, hauled the dry batches to the paver. They backed under the cement and aggregate bins, picking up the 7½-bag batches along with 5 ounces of Dewey & Almy Co. Darex AEA. It was added at the rate of ¾ ounce for each bag of cement. From the plant the batch trucks crossed the river on the contractor's work bridge. On the other side they backed up a short ramp and emptied their loads into the paver skip. Water for the mix was pumped from the river through a 2½-inch pipe line.

The saturated-surface dry weights for a typical 7½-bag batch of barrel concrete were as follows:

Cement	705 lbs.
Sand	1,323 lbs.
Traprock	1,799 lbs.

This was a 1:1.88:2.55 mix with a cement factor, corrected for air content, of 7.3 bags per cubic yard, and a water-cement ratio of 5.7 gallons per bag. Batches were mixed one minute. In

pouring the barrel, concrete with a slump of from 4 to 6 inches was desirable. But on the invert pours, where placing was less difficult, the slump was decreased to 1-3 inches by decreasing the water-cement ratio.

Inside the Tunnel

From the elevated sidehill position of the paver, the mixed concrete was discharged down a 30-foot metal-lined chute into the re-mixing hopper of the Pumperete machine. It was then pumped along through an 8-inch line to whatever section of the tunnel was being poured. The pipe line, supported on wooden cross members stretched across the top of the invert forms, ran down the center of the tunnel and discharged

into the forms below when the invert pours were being worked. Short chutes were used to carry the concrete out to the sides of the forms.

During the pouring of the invert, anchor bolts were inserted in the concrete along the sides. These were later used to support the barrel form when it was erected. As the concrete was placed it was vibrated by a couple of Ingersoll-Rand air vibrators. The surface was screeded to grade with a longitudinal metal screed 12 feet long which was moved back and forth inside the side forms. It was swung from guides suspended every 10 feet from the transverse bracing. The bottoms of the guides were cut on an arc, conforming to the curve on the invert, and came down to

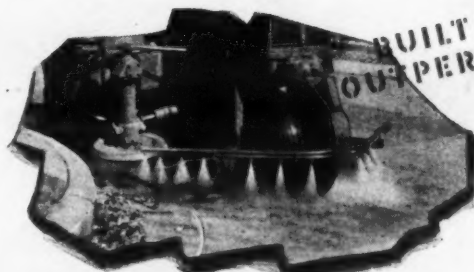
within 3 inches of the finished grade of the concrete.

Each 30-foot section of invert required 36 yards of concrete. Enough forms were prepared ahead so that three or four invert sections were poured in a day, working on alternate sections, of course. With this set-up the average production was 25 cubic yards of concrete per hour. Invert pours were made every 2 to 4 days. A crew of six worked at the outlet end of the pipe—with a larger crew, the men would have been in each other's way—placing the concrete, using the vibrators, checking the steel, and breaking the pipe lengths as the line gradually shortened. Telephone communication was maintained between

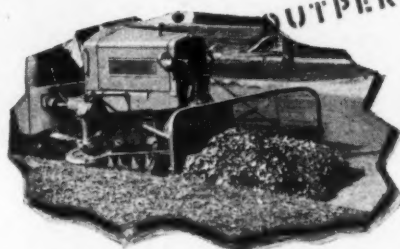
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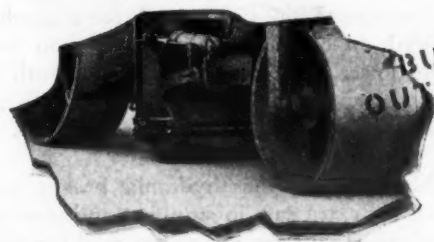
Performance



Cleaner streets, and more of them, for less money ... thanks to the many exclusive features of the Model 40 Sweeper.



The Leaf Broom on the Model 40 collects the leaves in handy piles for loading into trucks.

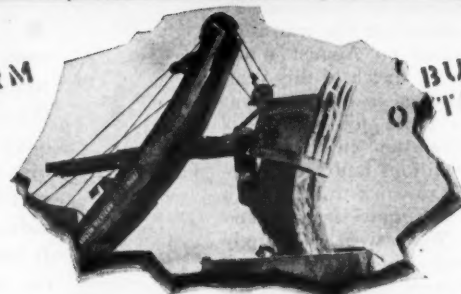


Smoother riding, longer lasting pavement ... thanks to the automatic, straight-edge action of the 3-axle Roll-A-Plane.

3 NEW Power Graders



See them at the Road Show



Badger ¾-swing design means more swings per minute, more yardage per hour, more profit for the owner.

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BUILDERS OF ROAD MACHINERY

Austin A Western

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the crews at the discharge end of the pipe and the Pumpcrete operator. But for the most part, the flow of concrete was regulated by a simple buzzer system with which the concrete crew indicated when to start and when to stop the movement of the concrete through the pipe.

Barrel Form

After the invert concrete had gained its initial set, the forms were removed, and the surface was sprayed with Konkure, a membrane curing compound manufactured by J. R. Anderson, Los Angeles, Calif. Later, wood ties were placed down the floor of the tunnel and T-rails were spiked to them. On these rails rode the 30-foot-long bar-

rel form, moving on four double-flange wheels. Known as a Mayo steel form, and built by the Lancaster Iron Works of Lancaster, Pa., it consisted of a structural-steel framework covered by a skin of 3/16-inch steel plates. The framework was 13 feet square, with 3 1/2 x 6-inch channels for the vertical members, and 2 x 6-inch channels for the chord members. Lateral bracing was chiefly with 3 x 3-inch angles. Ribs on 5-foot centers supported the horseshoe-shaped outer skin plates.

The form was not telescopic, but was hinged at the two upper 45-degree points. Before a pour, the metal surface was thoroughly cleaned and oiled in the collapsed position, then rolled over the rails to the section of the tunnel that

had been prepared for the arch pour. The wheels were blocked on the rails, and the form was then raised to the proper height by means of four manually operated jacks, one at each corner. The sides were moved outward into place by three horizontal jacks placed along each side, 2 feet above the bottom of the form. The jacks not only helped to support the form, but also permitted necessary adjustments to obtain the required thickness of concrete. Additional anchorage of the bottom of the form to the invert was afforded by the anchors left in the invert pours. Timber braces were also inserted along the sides for additional bracing.

Along each side, about half-way up on the form, were six inspection ports,

with six other ports in the roof. Through these 13 x 30-inch rectangular openings the concrete was vibrated as it was placed. When the concrete reached the level of these openings, the hinged ports were closed and bolted in place. They permitted a close check on the arch pours to see that the concrete was being placed properly.

In pouring a barrel, which took 72 yards of concrete, the pipe line was laid on the invert, running down the center of the tunnel. About 50 feet from the form, a couple of 45-degree bends raised the pipe to a trestle at the roof level of the form. The last 30 feet of line, known as the "slick pipe", continued down the top of the form to within 3 feet of the end at the beginning of the pour. This section of slick pipe was never broken as the pour progressed. The necessary shortening of the line was done by removing the regular 5-foot lengths back on the trestle, the workmen working on staging supported at a convenient level on the trestle framework. The whole length of slick pipe was then simply pulled back and hooked up to the shortened line, thus facilitating the pipe handling.

Air Slugger

To force the concrete well up into the rocky, uneven periphery of the tunnel and obtain a tight closely packed lining, an "air slugger" was used on the arch pours. The slugger was simply a stream of compressed air that entered the pipe line about 40 feet back from the entrance to the form. Air of 100-pound pressure was supplied through a 2-inch pipe line from an Ingersoll-Rand 500-cfm compressor set up outside the tunnel. Intermittent admission of air into the concrete line was controlled by means of a two-way quick-acting valve which responded to instantaneous regulation. This feature was important to check the flow of the compressed air through the pipe unless it was actually forcing the concrete along. The use of the air did get the concrete up against the roof of the tunnel which would have been difficult to achieve otherwise.

The compressor also furnished air to the vibrators through 3/4-inch lines, one for each machine. Another 2 1/2-inch air line also ran into the tunnel. This pipe was outfitted with a T-connection every 100 feet for attaching an air hose to clean muck from the sides and floor of the tunnel. The concrete line was cleaned out after a pour by pumping water, preceded by burlap wadding and a "go-devil" or free piston, through the pipe from the Pumpcrete machine to the outlet.

Clean water for washing out the tunnel was pumped to the working sections through a 2 1/2-inch line. An air pump sucked up the waste water and pumped it out of the tunnel through another 2 1/2-inch line. Upon the completion of a barrel pour, the form was lowered clear of the concrete by removing the bolts along the top members and loosening the vertical and horizontal jacks. After it was rolled away, the roof and sides of the concrete lining were sprayed with the curing compound, as was the invert. In warm weather the form was generally removed about 12 hours after the pour was completed; in cold weather the time was increased to 16 hours or more. Barrel pours were made at the rate of 5 or 6 a week. The form was ordinarily filled in 2 1/2 hours from the time pumping started.

Diverting the River

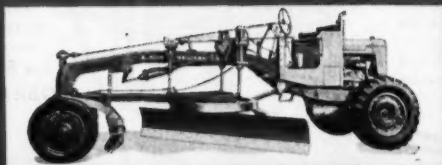
The Broome gates which were fabricated by Phillips & Davies, Inc., of Kenton, Ohio, were also installed last year. So was the cast-iron conduit lining adjoining them, also supplied by Phillips & Davies. In the shaft itself the concrete lining was poured to a height of 10 feet above the roof of the tunnel, but the remainder of the shaft will be lined with

(Concluded on next page)

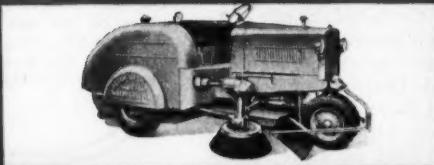
Preview

Performance — not machinery — is what you buy, and performance is what we sell. Exclusive "Built to Outperform" features are found in every Austin-Western machine . . . Plus Values accumulated by engineering experience that has lived close to road building and earth moving problems and practices since the first crude Austin-Western tools of 1859.

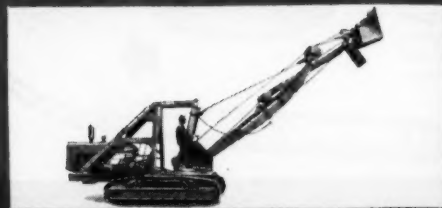
Let's talk performance!



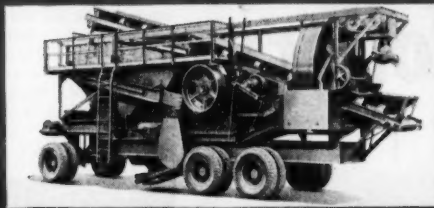
Wide variety of maintenance and light grading jobs made easily and economically.



Hand or left-hand gutter broom or both. Features for "one man" grading.



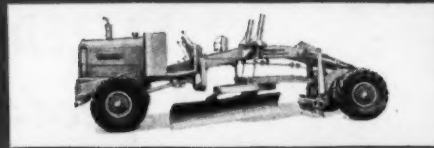
High elimination toll swing, increased stability, visibility.



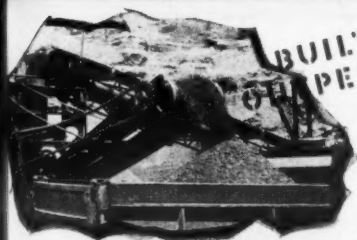
Jaw and roll crushers. One of many standard and



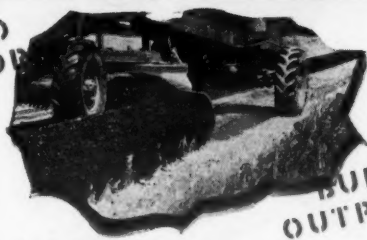
Sizes . . . variable weight tandem rollers are made in



cluding All-Wheel Drive, All-Wheel Steer, High-Lift Blade, and 20% more Power at the Blade.



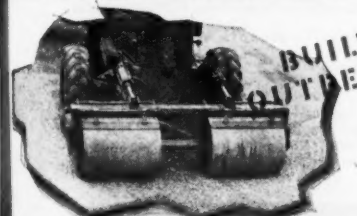
Austin-Western Crushing Plants are tops in output, thanks to the exclusive design features of A-W Jaw and Roll Crushers.



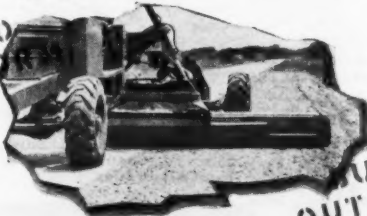
Controlled Traction moves more material farther and faster; all wheels miss the windrow.



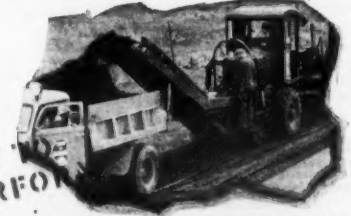
The 13-foot blade reaches several feet higher . . . thanks to the climbing power of All-Wheel Drive.



Roller Attachment on Power Grader has many uses . . . saves investment in costly, single-purpose equipment.



Rear steer makes it possible to finish slopes and shoulders in 10-foot swaths, leaving no tire marks.



Loader Attachment on Power Grader trims shoulders, balances quantities and does much other shallow excavation.



C. & E. M. Photo
Outside the diversion tunnel at Union Village Dam are William F. Miller, left, Concrete Superintendent for Savin Construction Corp., and Robert S. Johnson, Resident Engineer for the Corps of Engineers.

Dam Diversion Tunnel Lined With Concrete

(Continued from preceding page)

concrete this season. The latter work will not interfere with the river diversion. In the shaft the concrete will vary from 1 foot to 4 feet thick.

This spring a small diversion cofferdam was to be thrown across the river below the entrance to the intake channel for the tunnel. The designed height is elevation 427 which is 7 feet above the tunnel invert at the upstream portal. This is considered a sufficient barrier to turn the river into the left-bank tunnel. To prevent the water from backing up above the outlet end of the tunnel, another cofferdam will be built to elevation 420 downstream of the dam site and immediately above the outlet channel.

According to the construction sched-

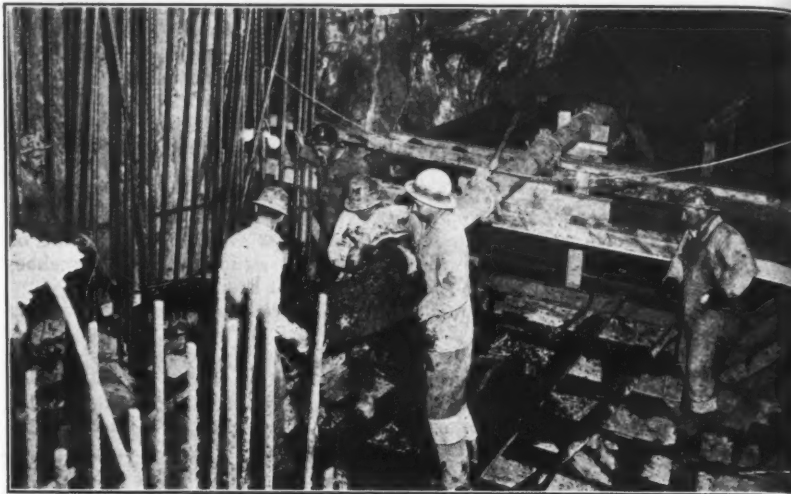
ule, the main cofferdam will be completed 10 days after the river is diverted. It will be built to elevation 444, or 24 feet higher than the tunnel invert at the intake end. This structure will be located 400 feet above the center line of the dam, and will be incorporated into the permanent rolled-earth-fill dam. Within these protecting earth cofferdams the foundation work will begin for the big dam which, when completed, will have a crest elevation of 584. The 388-foot concrete spillway weir will be built to elevation 564.

When the river is diverted and work on the dam proper begins, the existing road which follows the river can no longer be used. A new road, 4 miles long, is being constructed on higher ground, well back from the right bank or west side of the river, to replace the stretch that will eventually be flooded. N. D. Maselli Corp. of Bloomfield, Conn., is building the new road under a separate prime contract. It requires 250,000 yards of common and 13,000 yards of rock excavation. Work was started in the spring on a 3-span 225-foot bridge at the upstream end of the highway relocation. The bridge, which is scheduled to be completed in the autumn, will be built under another prime contract by Kenneth E. Curran, Littleton, N. H.

Quantities and Personnel

The tunnel lining here described accounted for 7,000 cubic yards of concrete and 345,500 pounds of reinforcing steel out of a total 535,000 pounds for the whole job. For the Savin Construction Corp., L. F. McCarthy is Excavations and Earth-Work Superintendent, and William F. Miller is Concrete Superintendent.

For the U. S. Corps of Engineers, Robert S. Johnson is Resident Engineer. The project is under the supervision of the New England Division of which Brigadier General Raymond G. Moses is Division Engineer with headquarters at Boston, Mass. Carl H. Lovejoy is



C. & E. M. Photo
Inside the Savin Construction Corp. tunnel job, we see the end of the Pumpcrete pipe line, with concrete being chuted off to the side.

Chief of the Operations Division of that office, and is assisted in direction of the New England Division's flood-control

construction program by E. H. Brown, Chief of Civil Works Branch of the Operations Division.

All The Features Needed For EFFICIENT VIBRATION

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Knowledge of concrete placement contributed by Bailey and leadership, in flexible shaft machines supplied by STOW, bring you the STOW Vibrator... the vibrator with the best head, the best power unit, and above all, the best shaft. It's the shaft that takes the gaff in machines like this—and it takes a STOW Flexible Shaft to keep the machine on the job.



STOW Concrete Vibrators come in a range of sizes and speeds... are all easy to move about and adapt to the job. The famous STOW Flexible Shaft is simple to lengthen to 35 ft. by adding sections. STOW Vibrators are also widely employed for wet and dry grinding, wire brushing, and other power tool operations through use of accessories.

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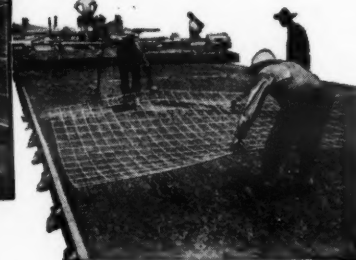
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Laclede shop-fabricated dowel spacers units are position-welded and supports are preformed for automatic alignment and ease of assembly on the job without wire-tieing.



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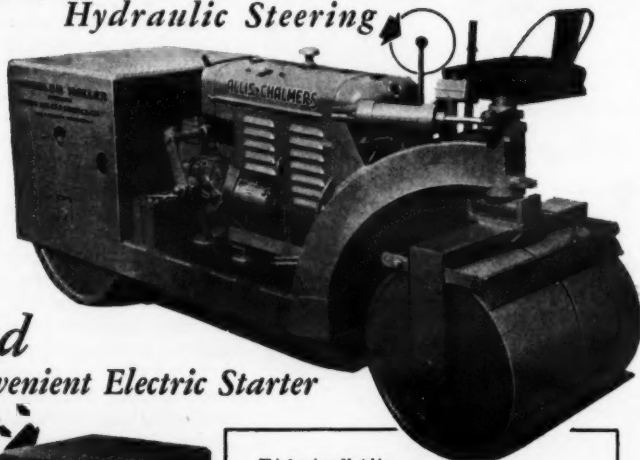
For economy and speed in construction—use LACLEDE STEEL Reinforcing Bars... Wire Mesh... Steel Center Joint... Recess Joint... Dowels and Tie Bars... Welded Dowel Spacers... Expansion Joints... Contraction Joints... Concrete Pipe Reinforcement... Pavement Accessories.

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The electric starter, now offered with the Wheeler Roller, simplifies starting and stopping. Idle running time is reduced and waste of fuel is minimized. Well within the operator's reach, the starter reduces the operator's labor and operating time.

NEW DEALERS are being added—Choice territories are still available

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SPECIFICATIONS

POWER: Allis-Chalmers Industrial Model B.
24.5 Brake Horsepower @ 1500 RPM;
27.8 Brake Horsepower @ 1800 RPM.
Speeds 2 forward and 2 reverse give 1.55 to 4 MPH range in either direction.

DIMENSIONS: Wheel Base 7' 10"; length overall 10' 7"; width overall 3' 6". Tank height 4' 10". Ground clearance 10" Left side clearance 1 1/2".

WEIGHTS: Shipping weight (approximately) 3500 lbs. Maximum weight (with ballast) 8000 lbs. Extra metal weight 400 lbs.

COMPRESSION: Per Lineal Inch: Compaction roller, 150 lbs. with ballast. Steering roller 70 lbs. with ballast.

TIMKEN BEARING EQUIPPED THROUGHOUT

Write for new 6-page folder.



The new Jaeger Sure-Prime portable pressure pump, Model 2PAFH, is gasoline-engine-driven, and it will handle up to 135 gpm.

Self-Contained Pump Features Portability

A self-contained pump designed for lifting water from surface supply sources and delivering it under pressure is announced by The Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. According to the manufacturer, at 10-foot suction lift the pump has a range of volumes and pressures varying from 135 gpm at 10-pound discharge pressure to 30 gpm at 60-pound pressure, and a maximum shut-off pressure of 70 pounds. The pump is mounted on a 2-wheel chassis, or it can be furnished on a base.

The 2-inch Model No. 2PAFH pump is driven by a Wisconsin gasoline engine rated at 5 hp at 3,000 rpm. The pump uses an open-bladed or thrash-type impeller which discharges upward from the bottom of the shell, agitating sediment and forcing it out with the flow of water. The Jaeger Lubri-Seal is said to seal the impeller shaft against air or water losses. The adjustable liner plate is replaceable. Other advantages claimed for the pump include the Sure-Prime feature and jet-priming. It weighs 150 pounds, including the pneumatic tires, mounting frame, and telescopic towing pole.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

Features and Construction Of Convertible Shovel Unit

A catalog describing the features and operation of the Buckeye Model No. 70 Clipper is being distributed by the Findlay Division, Gar Wood Industries, Inc., Findlay, Ohio. This unit is convertible for use as a shovel, dragline, crane, or trench hoe.

Bulletin No. 846-R features a description of the Mevac power control, showing how the various lever and pedals are applied and the way they affect the movement of the Clipper. A dismounted model of the machine is pictured to show the machinery deck and how it is rigged for front-end conversion.

The catalog also describes component parts of the machine in detail: the crawlers, the bull gear, the hooked conical rollers, the single drive and universal joints, the diesel power unit, the main-shaft assembly, the power

boom hoist and safety brake, and the operator's cab.

The booklet discusses the working advantages claimed for the Clipper, such as portability, increased capacities, full loads, improved dipper trip, and wide working range. One page is devoted to specifications and dimensions of the Clipper, while another lists the weight per cubic yard of various materials. The catalog also contains many photographs of the machine in use.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 71.

Bituminous Surfaces Planed and Processed

A new model of the Heater Planer has been introduced by the Spears-Wells Machinery Co., 1832 W. 9th St., Oakland, Calif. This machine is designed for planing and processing all types of bituminous surfaces. In operation, the Spearwell Heater Planer heats



This is a new model, No. 48, of the Spearwell Heater Planer for planing and processing bituminous surfaces.

the road surface and then planes off the high spots while the pavement is hot. Heat is supplied by 8 oil burners. The machine is one-man-operated.

The cutting and heating width on the Model No. 48 Spearwell Heater Planer is 50 inches. Power is supplied by a 79-hp 6-cylinder Hercules Model No. WXLC-3 gasoline engine. A 19-hp 4-cylinder Wisconsin Model VF-4 gasoline engine supplies auxiliary power for

the hydraulics and fuel oil. Working speeds are rated at 16 fpm and up, using two Fuller speed transmissions. Traveling speeds are said to be up to 12 mph. Vickers controls are used on the hydraulic accessories. The Model No. 48 is 8 feet wide, 34 feet 5 inches long, and weighs 27,100 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 97.

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Tar-Gravel Surface Paves Mountain Road

Shovel-Mixed Material Is Shaped With Grader, Then Rolled; Force-Account Job In White Mountains, N. H.

THE New Hampshire State Highway Department has put a pavement on the Sawyer Highway, State Route 118, through the White Mountain National Forest connecting Warren with North Woodstock. This scenic route, uphill all the way above Warren, had been developed from an almost impassable trail winding along the eastern slope of Mt. Moosilauke (elevation 4,810). Between 1933 and 1935 the CCC had enlarged the narrow trail to a gravel road 20 feet wide. The 10-mile surfacing improvement, scheduled for 1947, was divided into two 5-mile sections. Each was constructed with force-account employees of the Highway Department.

The upper section ties in to the black-top pavement of State Route 112 at the north end. The work on this portion was done during last July and August, and consisted of a mixed-in-place tar-gravel mat. The lower 5 miles, which is the subject of this article, was constructed next. At the north end it ties in to the section just completed. At the south end it connects with a short paved stretch of 118 that had been improved from Warren up to the edge of the National Forest. This piece lies wholly within the town of Warren.

On this lower half 55 culverts were lengthened during July and August, while the paving got under way early in September. Given a good break with some mild autumn weather, the maintenance forces made excellent progress. Except for seal, they completed their section by the end of November before cold weather put a halt to operations.

Pit-Mixed Tar and Gravel

The upper section was a tar-gravel mat mixed in place with motor graders. But the lower 5 miles consists of a tar-gravel surface, the materials of which were first mixed at the gravel pit with shovel and dozer. Later the mix was dumped on the old gravel road, spread and shaped by motor-grader blades, and rolled. It was to be finished off with a seal coat this spring when weather conditions permitted. Over the whole improvement the new surface is 20 feet wide.

Gravel for the mix was obtained from a pit off a dirt road east of State Route 25 between Warren and Wentworth, and about 6½ miles south of the lower end of the project. The bitumen, a T-6 tar, was purchased from the Independent Coal Tar Co. of Boston, Mass. The company shipped the material by rail in tank cars via the Boston & Maine RR to a siding at Wentworth. There it was

heated by a portable tank-car heater, and transferred to an Etnyre 1,200-gallon distributor mounted on a GMC truck and hauled 1.3 miles to the gravel pit.

The gravel was loaded by a Byers ¾-yard crawler shovel, hauled, and dumped over a high bank at one side of the pit. A ½-yard Byers Traveler shovel was placed at the base of the piled gravel. It picked up the material and placed it alternately in piles at the left and right rear corners of the shovel.

The tar was heated to 140 degrees F by the burner on the distributor. It was applied to the gravel from the 1,200-gallon distributor through a 2-inch x 30-foot-long pipe with four spray nozzles at the outer end. This pipe was supported at its center by a tripod about



C. & E. M. Photo

At the gravel pit which supplied material for this New Hampshire surfacing job, a Quick-Way truck shovel loads tar-gravel mix into an International truck.

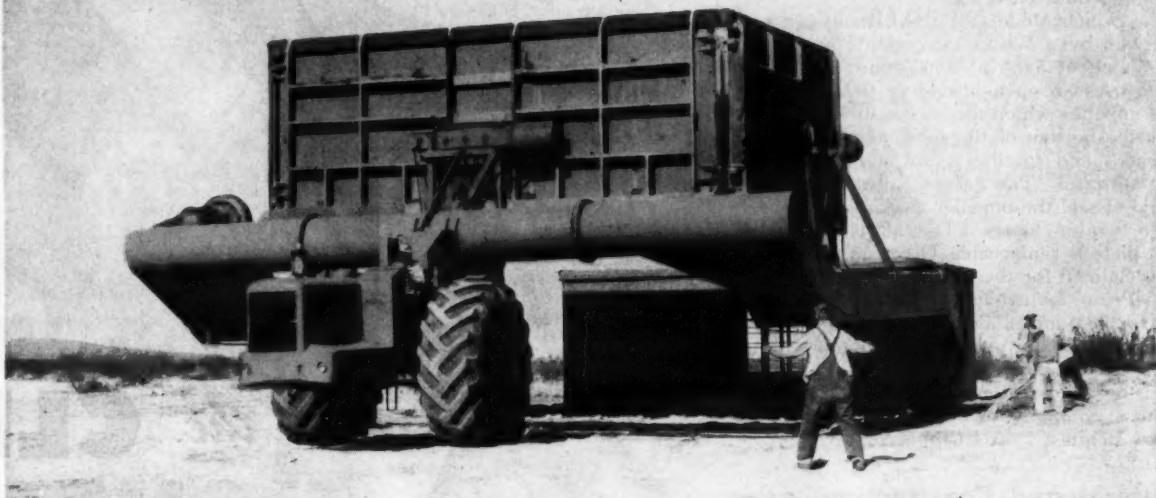
10 feet high. As each dipperful of gravel was placed, it was sprayed with 10 gallons of tar by a man at the distributor end of the pipe, who held the spray nozzles over the pile. As the shovel

swung to place another dipperful on the pile previously sprayed, the man pivoted the pipe line on the tripod and sprayed the other pile. This operation

(Continued on next page)

TOURNALAYER

New Job-Proved Home-Building Method



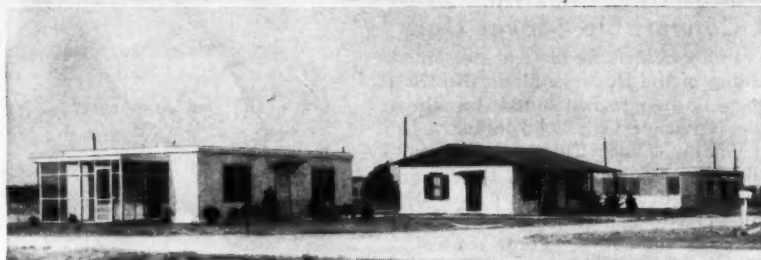
More Profitable 4 Ways

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Tournalayer mass-home-building method produces distinctive, permanent homes at the rate of one basic unit per day with each set of forms employed . . . Number of forms used is determined by contractor . . . Pre-design of each basic unit is possible and any number or combination of various-sized basic units may be utilized in the planning and construction



ARIZONA — Actual job photo of operations at Yuma, Arizona, where 38 homes 1344 sq. ft. in size are currently being completed

TEXAS — These LeTourneau homes recently completed in South Texas show three variations in architectural treatment.

of a house . . . This means virtually unlimited freedom of design!

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LeTourneau homes are built of insulating concrete reinforced with steel-masonry homes that are storm-proof and fire safe, qualifying for a much lower than average insurance rate . . . Extremely durable, LeTourneau homes are termite-proof and cost little to maintain . . . They're cooler in summer — cost less to heat in winter . . . Permanence and individuality of

each house design assures high resale value years from now!

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LeTourneau homes are not prefabricated, but are permanent, masonry homes that the builder can design individually, yet mass produce and sell for less than the price of a conventional house . . . These beautiful, well-built homes are now being constructed by firms in North and South America as the low-cost answer to critical need for permanent, livable homes.

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Our Price . . . \$1.00 F.O.B. Illinois

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Minimum quantity 25

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ACME EQUIPMENT CO., INC. 126 28 S. CLINTON STREET, CHICAGO 6, ILLINOIS

of alternately piling and spraying the gravel continued until the distributor was empty. With a little practice, it was so synchronized that by the time 120 cubic yards of gravel had been placed, the 1,200-gallon distributor was empty, ready to go back to the tank car for another load.

As soon as the distributor was emptied, the sprayed gravel was picked up by the shovel and placed in a pile at the right. From this point a Caterpillar D6 tractor-dozzer mixed it by pushing it into a large stockpile at some distance from the shovel. It was noted that in this pushing operation the tar and gravel were so well mixed that little mixing with the shovel had to be done there.

A total of 5,835 cubic yards loose measure was mixed in fourteen 9-hour working days, or an average of 417 cubic yards per day.

Laying the Mix

In preparation for the tar-gravel surface, the CCC-built gravel road was shaped by a motor grader, either an Austin-Western 99-M or a Galion, and rolled by a Galion 10-ton 3-wheel roller. During the exceptionally dry autumn throughout New England, the subgrade was wet down in advance of the shaping and rolling. A Jaeger 2-inch pump pumped the water from the east branch of the Baker River, near the lower end of the job, into a 1,000-gallon tank truck. The truck sprinkled half the width of the road at a time by gravity flow through a 10-foot spray bar.

In one location a curve in the alignment was straightened out by moving 10,000 yards of dirt. And at another spot about ½ mile of gravel subgrade had to be renewed to eliminate frost distortion. Otherwise the old road was in good shape.

Within 10 days after the final mixing of tar and gravel, enough subgrade had been put in shape to receive the mix. At the pit a Quick-Way 0.40-yard truck shovel, on an International truck, loaded the material into a fleet of 17 trucks that were rented by the hour. Practically all the equipment used on the job was rented. A larger shovel, a ¾-yard model at least, would have been preferred for the loading, but only the 0.40-yard model was available. What the little unit lacked in size it made up in speed, however, and the smooth-working operator kept it spinning like a merry-go-round, loading a truck first on one side and then on the other as it backed into the face of the stockpile.

The surfacing started at the north end of the job and worked back towards the pit. Thus the maximum haul was 11 miles, uphill all the way (elevation 650 to elevation 2,640) with a peak grade of 15½ per cent. When they reached the working area the trucks turned around and moved downhill, end-dumping the mix in a windrow covering half the road. The trucks were individually owned and were of various capacities, carrying usually 3½, 4, 5, or 6 yards per load. The design called for 3½ inches of loose material over the 20-foot width which would compact under rolling to a 3-inch mat. This quantity worked out so that a cubic yard of mix sufficed for 4.63 linear feet of full-width highway pavement.

But the windrows were put down in two 10-foot lanes, about 100 feet first on one side and then the other side to bring them up even. To get the correct distribution of material, a rope 58 feet long was attached to the rear of a truck about to dump a load. Red cloths or markers were fastened to the rope at the proper intervals showing how far a 3½, 4, 5, or 6-yard load was to go when dumped in a 10-foot windrow. A stake was put into the ground at the beginning of the run, and as the specific marker crossed the stake the mix was supposed to have been emptied.

After a little practice the drivers



C. & E. M. Photos

gaged their speed to a nicety in discharging their truck contents. Whatever error was made, it was considered better to empty the trucks too quickly rather than have a surplus dumped at the end of the run. For it was easier for the graders to push material ahead than

A truck dumps a load of mixed tar-gravel in a windrow down half the width of the New Hampshire State Route 118 (left). Then an Austin-Western 99-M motor grader (right), with a 12-foot blade angled to the side, shapes and spreads the mix on the road.

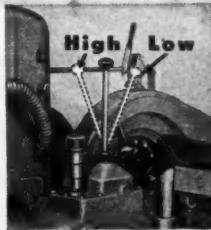
to pull it back over bare spots. The next truck always started at the place where the preceding one should have finished, whether it did so or not.

Shaping and Rolling

As the mix was dumped it was carefully scanned for large stones. These (Concluded on next page)

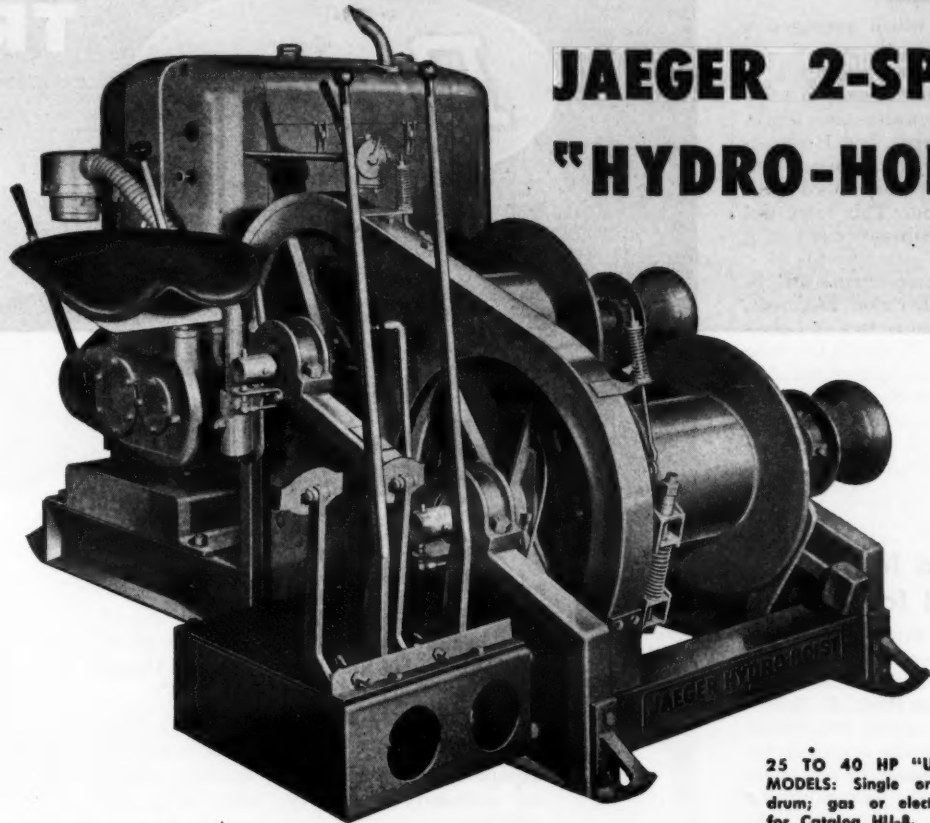
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Just shift a lever to "Low Gear" for power, "High Gear" for speed with lighter loads.



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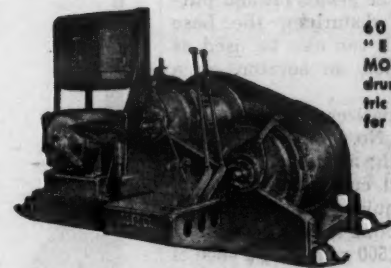
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MODELS: Single or double drum; gas or electric. Ask for Catalog HU-8.

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All-steel construction (no more broken side frames or drum flanges), instant releasing hydraulic clutches with single outside adjustment, air-cooled hydraulic brakes, many other advanced features. See your Jaeger distributor, or ask for Catalog.



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Tar-Gravel Surface Paves Mountain Road

(Continued from preceding page)

were removed either with forks or stone picks and thrown off to the side of the road so as to keep the material of fairly uniform consistency. The gravel pit supplying the material was coarse in places and contained some 4-inch stone which had to be discarded. It was because of this larger material that a spreader box could not be used to place the material on the road.

One of the graders then shaped the tar-gravel mix, making probably a half dozen passes until a smooth satisfactory surface had been obtained. On tangents the road has a center crown of $\frac{1}{4}$ inch per foot, while on curves the grader worked in the proper bank. When the grader got through, the mat was rolled only once by the 10-ton 3-wheel roller. The edges of the new pavement were feathered out into the shoulders. In a few locations the road was widened to permit a lane where cars could park to enjoy the scenic view.

With the mat completed, the surface is to be given a seal coat consisting of $\frac{1}{4}$ gallon of T-5 tar to the square yard. This will be followed by a covering of sand applied at the rate of 80 cubic yards to the mile. The bitumen will be shot half the width at a time, and the sand blotter will be applied from trucks using an Anderson power sander. A broom drag pulled by a truck will flush the surface, spreading the sand out evenly.

Personnel

A working force which averaged a dozen was employed on the project, including 2 motor-grader operators, a roller man, 2 on the bituminous distributor, a driver for the water-tank truck, 5 laborers, a timekeeper, and Foreman Clifton A. Davis. The truck drivers are not listed since they were hired with the trucks by the hour. This force did 1,850 feet of full-width pavement in a 9-hour day.

The project was supervised by E. S. Hastings, Assistant Division Engineer, Division 4, with headquarters at Lebanon, N. H. Farwell A. Brown is Division Engineer. LeRoy F. Johnson is Maintenance Engineer of the New Hampshire State Highway Department which is headed by Frederic E. Everett, Commissioner. D. H. Dickinson is Chief Engineer.

Asphalt Road Mats Prepared for Re-Use

A machine for scarifying, pulverizing, and preparing old asphalt top courses for re-use is announced by the Wood Mfg. Co., 6900 Tujunga Blvd., N. Hollywood, Calif. Known as the Preparizer, it is recommended by the company for use with oil mats, asphalt, or macadam pavements. A hydraulic jack mounting is designed to provide control over scarifying and pulverizing depths so that oil mats can be peeled off and pulverized without disturbing the base material. The unit can also be used as a material blender, an aerator, or a drier.

The Wood Preparizer is made in two sizes: the Model No. P-400 which will cut a 4-foot width; and the Model No. P-600 which will cut a 6-foot width. The P-400 is equipped with a Buda Model L-525 gasoline engine which develops 90 hp at 1,500 rpm. The P-600 is equipped with a Buda Model MO-645 gasoline engine which develops 120 hp at 1,400 rpm. (Either unit can also be rigged to be driven from the tractor power-control unit.) A Vickers hydraulic pump is V-belt-driven from the engine, and a Vickers control valve permits separate and positive control of each wheel, it is stated.



The new Wood Preparizer scarifies, pulverizes, and prepares for re-use oil mats and asphalt or macadam pavements. The unit is made in two sizes.

The scarifier is built in a fixed position to insure its operating in the same plane as the pulverizer rotor cutters. The rotor shaft is mounted in Dodge-

Timken pillow blocks equipped with dust seals. The P-400 rotor shaft has 7 disks and 28 cutting blades; the P-600 has 11 disks and 44 cutting blades.

Weights of the two units are 8,000 and 12,000 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

Mack Trucks Promotions

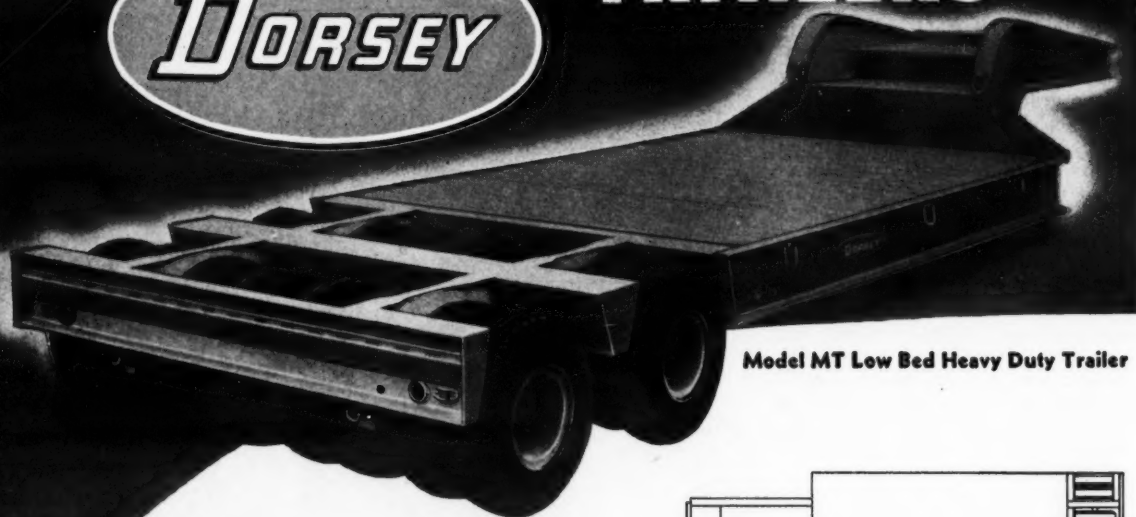
Harry Bernard is the new Chief Engineer for Mack Trucks, Inc. He was formerly Director of Service and Service Engineering. The appointment of John Walker as Manager of Off-Highway and Mining Truck Sales was announced at the same time. Both men will make their headquarters at the company's main offices in the Empire State Bldg., New York City.

C. F. Larsen is named Manager of General Service and C. A. Slifer will assist him as Assistant Manager. Both men will make their headquarters at the company's Plainfield, N. J. plant. Also announced is the appointment of George McCall as Manager of Service Engineering, with offices at Mack's Long Island City, N. Y., plant.

BUILT FOR Performance

Low Bed HEAVY-DUTY TRAILERS

DORSEY



Model MT Low Bed Heavy Duty Trailer

From years of engineering experience in heavy construction comes the NEW, COMPLETELY REDESIGNED 1948 Dorsey Low Bed HEAVY DUTY TRAILERS.

Unusually rugged, sturdy and compact, the Dorsey Low Beds will move your heaviest equipment, power shovels, tractors, cranes, or stationary machinery, with safety and efficiency.

The Dorsey Low Bed Trailers have the lowest possible center of gravity and are equipped with the safest braking system, larger models being hydraulically operated through master cylinder actuated either by air or vacuum.

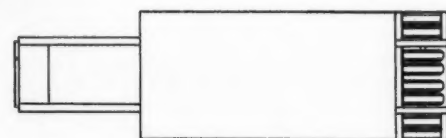
Here is a series of real Low Beds, with minimum platform height and including, as Standard Equipment, rear loading ledge, air or vacuum brake equipment, lights and reflectors and tool box.

Get the outstanding Low Bed Trailer
Get a Dorsey

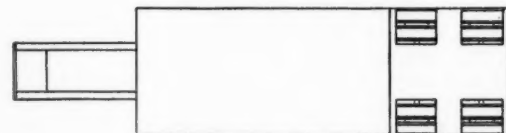
MODERN

Designed

TRANSPORTATION



Model M 15-20-25 Tons



Model MTS 15-20-25-30-35 Tons

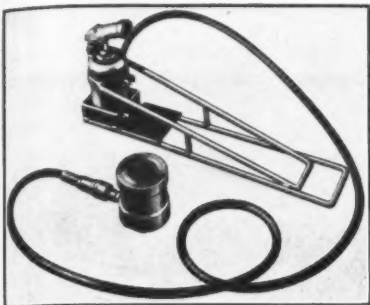


Model MK 10-15 Tons

DORSEY INC.

TRAILERS

ELBA, ALABAMA, U.S.A.



The Lo-Hite hydraulic jack has an independent pump which can be operated from a distance; the jack itself is spotted in close, confined positions.

Hydraulic Jack Has An Independent Pump

A hydraulic jack with an independent pumping unit is announced by The Duff-Norton Mfg. Co., P. O. Box 1889, Pittsburgh 30, Pa. It is especially recommended by the company for lifting jobs where the jack has to operate in close quarters, as its special construction permits the use of a limited amount of space. The jack is spotted close in, while the pump can be located at a distance away. The pump is connected to the jacking mechanism by a length of rubber tubing. The manufacturer points out that the oil in the Lo-Hite jack is sealed in, thus permitting its use in both vertical and horizontal positions.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.

Magnetic Separator For Crushing Units

A non-electric magnetic separator adaptable to use in rock-crushing and similar operations is announced by the Eriez Mfg. Co., Dept. A-18, 420 Commerce Bldg., Erie, Pa. The Eriez Giant magnet requires no wiring, electricity, or electrical accessories. The manufacturer explains that the magnet is unaffected by water or wet materials; that it provides uninterrupted protection; that it withstands temperatures of up to 600 degrees F; and that it has no operating costs.

Two models are available: one is for stationary installation in open chutes, while the other is equipped with hinges and latches for enclosed chutes. The hinges permit the unit to be swung down for cleaning. The fact that both models are insulated to prevent magnetic leakage allows direct installation on steel.

The separator is made from Alnico castings said to provide a deep, constant, and uniform magnetic field for removing tramp iron from heavy free-flowing materials. The effective cleaning range varies according to the size of material and operating conditions. Special face plates are built of abrasion-resistant steel; they are furnished in either flat or stepped pole faces, as required by the application and the size of metal to be removed.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Small-Size Concrete Pipe

Concrete pipe in small sizes will be produced at the Rochester, N. Y., plant of the Universal Concrete Pipe Co., 297 S. High St., Columbus 15, Ohio. Pipe machinery at this plant is now geared to make pipe of 4, 6, 8, 10, and 12-inch diameters. These will be produced in addition to the company's regular line of pipe ranging in diameters up to 72 inches. The small pipe is made on a spinner-type machine, and fittings for the pipe have been made available.

Universal maintains plants in Syracuse, Port Washington, and Binghamton, N. Y., as well as in New Jersey, Pennsylvania, Georgia, Alabama, West Virginia, Tennessee, and Ohio.

Soil Mechanics Book

A text called "Fundamentals of Soil Mechanics" has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City 16, N. Y. The book was prepared by Donald W. Taylor, Associate Professor of Soil Mechanics of the Massachusetts Institute of Technology. It is devoted principally to fundamental theories, but emphasis is placed upon correlating these theories with their applications in laboratory and field problems.

Preliminary definitions and explanations of the terms used in soil-mechanics studies are presented in the introductory chapters of the text. From there the book progresses to a discus-

sion of soil tests, seepage through soils, strength and deformation characteristics, stability of slopes, bearing capacity, and other phases of soil mechanics.

The volume has 700 pages and is indexed for use as a reference book. It also contains a bibliography and a table of symbols and their meanings as applied to soil mechanics. The book sells for \$6.00.

Reflector-Button Signs

A 24-page catalog covering a line of traffic signs and light-reflecting safety buttons has been put out by the Cataphote Corp., Wall St., Toledo, Ohio. This equipment is designed to increase

night-driving safety, and is produced in a wide range of styles to meet many needs.

The catalog lists the various products of the company and shows how they are constructed and applied. It describes features of the signs and markers, and also illustrates many of them in use. The catalog explains the theory of operation of the reflector buttons, and lists the styles in which they are made—front-entrance, rear-entrance, and curb markers. It also discusses the several types of signs which can be furnished—movement, parking, speed, stop, warning, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 60.

Check your present scraper against these modern LAPLANT-CHOATE

features

SCRAPER EVALUATION CHART			
Design features which affect production ability—loadability—haulability—spreadability—of scrapers.			
	Points	LPC	Score
1. a. Curved Bowl Bottom	10	10	
b. Flat Bowl Bottom	5		
2. a. Offset Cutting Edge	10	10	
b. Straight Cutting Edge	5		
3. a. Low Center of Gravity	10	10	
b. High Center of Gravity	5		
4. a. Open Top Bowl	10	10	
b. Obstructed Bowl Top	5		
c. Weight Distribution 45% front 55% rear	10	10	
d. Weight Distribution Otherwise	5		
5. a. Weight empty	10	10	
b. Under 5% variation	6		
c. 5% to 15% variation	2		
d. Over 15% variation	10	10	
6. a. Interchangeable Tires—Front & Rear	10	10	
b. Non-interchangeable Tires	5		
7. a. Positive Forced Ejection	10	10	
b. Gravity Dump	7		
8. a. High Apron Lift	2		
b. Medium Apron Lift			
c. Low Apron Lift			
9. a. Superior	10	10	
b. Average	6		
c. Inferior	2		
10. General Maintenance & Serviceability	10	10	
Characteristics			
a. Superior	10	10	
b. Average	6		
c. Inferior	2		
Total		100	
Capacity	Average Weight	Height of Apron Lift	
Struck Yards	# Manufacturers	High	Low
12—15	21,950	100" & up	Under 70"
7—9	15,143	90" & up	Under 60"
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FOR LOWEST POSSIBLE COST
PER YARD...PER JOB...PER YEAR

New Highway Utilizes A Century-Old Bridge

Reconstructed 3.7-Mile Section of National Road Carried on 1819 Masonry Arch; Concrete Pavement

† THE National Road, one of the earliest of this country's great highways, is being reconstructed along a 3.7-mile stretch in eastern Ohio. The section is between Hendrysburg and Morristown in Belmont County, which lies across the Ohio River from West Virginia.

Better known now as U. S. 40, the National Road was among the first to penetrate westward beyond the Alleghenies. When it was constructed in 1819, through what was then practically a wilderness, the streams were spanned by masonry stone arch bridges. Now 129 years old, these bridges are still in good condition with the help of an overhaul job back in 1917. One, in fact, is still being used in the present improvement. Another has been replaced, only because of a shift in alignment, by a 3-cell concrete box culvert.

The Ohio Department of Highways awarded a contract for the 3.7-mile project to A. J. Baltes, Inc., of Norwalk, Ohio, on its low bid of \$1,460,846. Included in the contract are the principal elements of grading, drainage, and paving with reinforced concrete. Work got under way on the grading in October, 1946, but little progress was made through the winter because of the inclement weather. In April, 1947, the contractor resumed full-scale operations. However, the autumn and cold weather set in before the pavement could be started. The project will be finished this construction season.

Old and New Roads

When this section of U. S. 40 was originally built, it had a crooked alignment over sharp hills with a maximum grade of 8½ per cent on a continuous curve. Furthermore the pavement was only 16 feet wide, and consisted of a brick surface built on a sandstone foundation with a concrete curb bordering each edge. Over the years the brick pavement had been covered with black-top, but the whole surface was rough, broken up, and uneven.

Nearly four-fifths of the reconstruction is on new location with a minimum paved width of 24 feet and a maximum grade of 6½ per cent. On 8,800 feet of the project a dual highway is being built to carry four lanes of traffic. Each half of the dual highway will have a 22-foot pavement made up of two 11-foot slabs. On the inside edges of the concrete are 6-inch curbs which are separated by a 4-foot black-top divisor strip. On the outside edges of the pavement, for nearly the full length of the job, are 8-inch-thick concrete gutters, 3 feet wide, which are laid through both cuts and fills.

Beyond the gutters on the single highway carrying only two traffic lanes are 5-foot shoulders in the cut sections, and 7-foot shoulders on the fills. The 3-foot gutter serves as additional area to

permit cars to pull off the pavement. On the dual highway with four traffic lanes, the shoulders are 8 and 10 feet respectively in the cuts and fills. In cuts, slopes range from 1 to 1 in rock to 2 to 1 in average material. In fills, slopes range from 2 to 1 to 2½ to 1 depending on the amount of excavation available. Ditches are 3 feet across and 2 feet deep. Both ditches and slopes will be either seeded or sodded. All curves will be superelevated to handle speeds of 50 mph. The normal center crown of a 24-foot tangent section is 2½ inches.

About 9 miles of tile underdrain, from 4 to 21 inches in size, has been built into this new road. On the single highway the open-joint tile was installed on both sides, 2 feet beyond the edge of the pavement. On the dual highway



C. & E. M. Photo

This is the stone arch bridge over Stillwater Creek which was widened to 30 feet to carry the National Road. The structure was built in 1819.

the tile was laid both along the edges and also under the center divisor strip on superelevated curves. The trenches were backfilled with crushed stone.

Drainage Structures

As mentioned before, one of the old

stone arch bridges on the old road could not be used because of a change in the alignment to eliminate a hill and curve. But the 1819 structure over Stillwater Creek at the east end of the project, with a few minor changes, will still

(Continued on next page)



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Yes, an Oliver "Cletrac" crawler tractor and Drott Hi-Lift Loader give you a high, wide and handsome method of stepping up your dirt-moving operations.

High... a 10½ foot lift from ground to hinge pin of bucket for easy loading into trucks up to 8½ feet high.

Wide... a deep, wide bucket that gets a full load every time. Bucket pivots...raising the cutting edge 16 inches...on two rugged shoes before lifting. With this effective break-out action, you can't help but get a bigger load without spillage.

Handsome... plenty of sure-footed power

that gives you top crowding and stripping action with a husky Oliver "Cletrac" tractor.

This hydraulically operated tractor-loader unit bears down and in as it loads, then tilts upward like a shovel for a full bucket every time. If desired, the unit can be used for bulldozing. Remember, with the famous Oliver "Cletrac" balanced design, there's no excess strain on tractor frames or steering mechanism even with a full loaded bucket.

Let your Oliver "Cletrac" dealer show you how you can dig high, wide and handsome with this new unit.

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A complete line for every type of Rock
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"THE SIGN OF
EXTRA SERVICE"



C. & E. M. Photos

Part of the subgrade blanket-course material for the National Road was limestone excavated from the big cut on the job. Above, a Northwest 1½-yard shovel loads the material to a Cedarapids 20 x 36 portable jaw crusher. At right, a close-up of the crushing plant.



carry on the function for which it was designed and built.

This latter bridge had a clear span of 40.3 feet, a rise of 9.5 feet, and a 26-foot clear roadway. Existing spandrel walls and wing walls were removed to an elevation 1½ feet below the new gutter grade. By cantilever construction in conjunction with the proposed reinforced-concrete pavement, the 26-foot roadway was increased to 30 feet, and curbs 2 feet 5 inches wide were provided. These curbs will carry a new steel railing and leave 1½ feet for pedestrian travel. The spandrel arch will carry about 18 inches of fill over the keystone. All the new work is of reinforced concrete.

The bridges were constructed by C. P. Calloway of Toledo, Ohio, who personally supervised his crew of 15 men. Besides rebuilding the Stillwater Creek arch, his work included the construction of three large reinforced-concrete culverts. The smallest of these is a single-cell box 93 feet long with a 14-foot span and a height of 7½ feet. A timber bridge was replaced by a 2-cell box, 135 feet long, with two 12-foot spans and a 7-foot height. The other stone arch bridge that could not be utilized was replaced by a 3-cell box culvert, 107 feet long, having a height of 15½ feet and cell spans of 15½, 19, and 15½ feet respectively. The new structure was built just to the south of the stone arch.

The dimensions of the box culverts are as follows:

	Outside Wall	Inside Wall	Top	Bottom
One-cell	12 in.	12 in.	12 in.	14 in.
Two-cell	12 in.	12 in.	8 in.	9 in.
Three-cell	14 in.	12 in.	14 in.	15 in.

Form work consisted of 1-inch boards backed by 2 x 6 studs on 18-inch centers, and with double 2 x 6's as wales at various spacings. These were made up in 4 x 12-foot panels which were held together by Universal ½-inch tie rods.

All the concrete used was mixed at each location in a CMC 3-bag mixer. A CMC 22-yard aggregate batcher was also moved around from one structure to another. The aggregate was supplied by the same producers which furnished the fine and coarse aggregate for the concrete pavement. The sand came from the Buckeye Sand & Supply Co. at Bel-laure, Ohio, while the slag, used for the coarse aggregate, was furnished by the

Standard Slag Corp. of Steubenville, Ohio. The material was usually shipped

(Continued on next page)



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40 TON LOAD ON

Firestone
ROCK GRIPS

40 TO 50 TONS of coal to the load . . . 21 loads in 7 hours . . . a total of 900 tons of coal hauled from the pit to the tipple, three miles away!

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In this operation where minutes mean dollars, Firestone Rock Grips are cutting downtime to a new low. That's because they are built with the extra strength and the extra toughness necessary to carry those 90-ton gross loads month in and month out and stay on the job every minute. They stand the gaff.

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FIRESTONE OFF-THE-HIGHWAY TIRES

New Highway Utilizes A Century-Old Bridge

(Continued from preceding page)

by rail to the B. & O. RR siding at Barnesville, Ohio, and hauled in trucks the 6 miles from there to the job. Medusa cement was used in the concrete.

The mixed concrete was delivered to a $\frac{3}{4}$ -yard concrete bucket which was lifted to the forms by a Lorain crane with a 45-foot boom.

Grading

This 3.7-mile job involved over 800,000 cubic yards of excavation. But despite some slides, the cuts and fills balanced so that no borrowing of material was necessary. The job featured one single cut about 1,500 feet long from which was taken 360,000 yards of mixed material that went into an adjoining fill 2,500 feet long. At the top, the cut is 400 feet wide; it has a maximum depth of 100 feet to the grade line, where it has a width of 88 feet. Within this cut were four different limestone ledges, ranging in thickness from 8 inches to 4 feet, and separated by layers of dirt 2 to 15 feet thick. At a depth of 55 feet below the crown of the hill the contractor came upon a $3\frac{1}{2}$ -foot vein of coal lying between two layers of limestone. This of course was also excavated, but was disposed of instead of being put in the fill with the rest of the material.

The fill adjoining the cut has a height of 50 feet, a 320-foot bottom width, and is 60 feet wide on top. This section of cut and fill carries a 4-lane pavement.

Wherever rock was encountered on the job, blast holes were drilled with three Cleveland wagon drills powered by three 315-cfm compressors—a Worthington, Le Roi, and Gardner-Denver. Drill steel, $1\frac{1}{4}$ -inch round, in 6 and 12-foot lengths, was used in the wagon drills along with Timken $2\frac{1}{2}$ and $2\frac{3}{4}$ -inch bits. As many as 600 holes on from 3 to 6-foot centers were shot at a time with the maximum lift being 12 feet. From 6 to 12 sticks of Austin 40 per cent dynamite were put in the 12-foot holes. The results of the blast were usually 1 cubic yard of rock to 1 pound of powder.

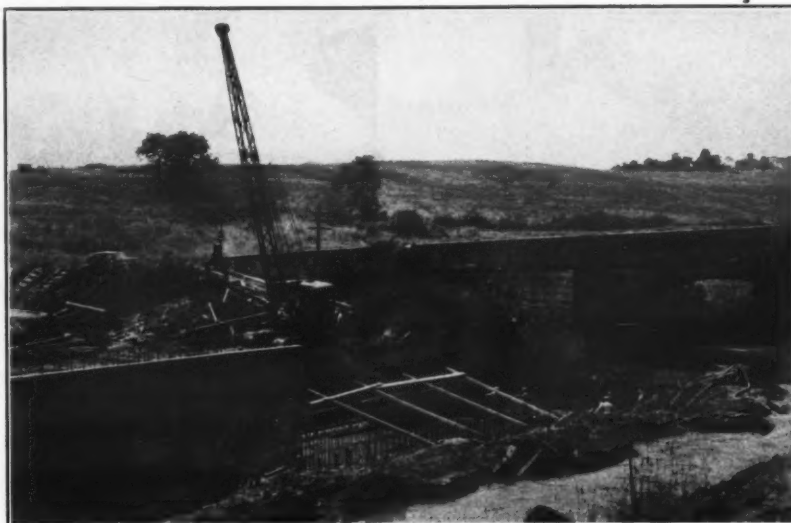
The broken-up rock was handled by a Manitowoc $2\frac{1}{2}$ -yard and a Northwest $1\frac{1}{2}$ -yard shovel. At the beginning of the job when the grades were steep, the rock was hauled in four Athey crawler-type wagons, and an Athey rubber-tired wagon pulled by a Caterpillar DW10 rubber-tired tractor. Later four end-dump Euclids were added to the fleet of rock-movers. All these units averaged about 12 yards each. The rock was spread out on the fills in 3-foot layers.

For the long dirt hauls averaging 3,000 feet the shovels and end-dump Euclids were employed, together with seven bottom-dump Euclids holding 16 yards a load. A Euclid loader was also used to fill the big dirt-movers.

On the shorter dirt hauls averaging 800 feet tractor-scraper units were employed. During the extremely wet spring and summer the scrapers were often hauling 1,000 feet when the rains made the job site too soft for the rubber-tired equipment. Four LeTourneau scrapers were used, carrying 15, 18, 23, and 30 yards respectively, and pulled by Caterpillar D8 tractors. Two other D8 and two D7 tractor-dozers were available to help in loading or spreading the dirt over the fills in 8-inch lifts.

The fills were compacted to 95 per cent density at optimum moisture content with two LaPlant-Choate sheep-foot rollers pulled by RD7 tractors. Water was added when necessary from a Studebaker and an International 1,500-gallon tank truck; water was pumped from the creeks with a Jaeger 4-inch pump.

With this equipment an average of



C. & E. M. Photo

A Lorain crane with a 45-foot boom and a $\frac{3}{4}$ -yard clamshell bucket excavates a footing for the 3-barrel concrete culvert to replace the old stone arch in the background. The arch was still in good condition but could not be used to carry the National Road because of alignment changes.

6,000 yards of dirt was moved in a 10-hour day.

Blanket Course

In accordance with the road design, a blanket course of pervious material graded from 3-inch down to No. 10 size was placed on top of the subgrade before any concrete pavement was laid. This course is from 9 to 21 inches thick. The variation is due to the fact that the blanket-course subgrade slopes at a rate of $\frac{1}{2}$ inch per foot, while the pavement slopes at a rate of $\frac{1}{4}$ inch plus per foot. The course extends from 1 to 2 feet beyond the edge of the pavement. Nearly 30,000 yards of material was required for the project to make up the blanket course. Of this yardage about 5,000 yards came from the big cut; material excavated from a limestone ledge was run through a Cedarapids 20 x 36 portable jaw crushing plant. Production was at the rate of 50 tons per hour. The Northwest $1\frac{1}{2}$ -yard shovel loaded the hopper on the crush-

(Concluded on next page)

NATURALLY BETTER...

LION
NATURALUBE
D.H.D. OIL FOR DIESEL AND
HEAVY DUTY MOTORS

Better by Nature

- **REMOVES HARD CARBON**—Nature gave Naturalube remarkable carbon removing ability. Cuts power loss and wear.
- **STRONGER PROTECTIVE FILM**—The naturally tougher film of Naturalube provides extra protection for motor parts.
- **GREATER PENETRATION AND ADHESION**—These natural qualities assure better lubrication from the time the engine starts. Lion carefully safeguards these superior qualities during refining.

Reinforced by Lion

- **RESISTS FORMATION OF SLUDGE**—Lion especially reinforces Naturalube D.H.D. to make it resistant to formation of harmful sludge and lacquer... to keep motors cleaner.

GUARANTEE

If you don't believe Naturalube D.H.D. is the best oil you've ever used, Lion Oil Company will give you your money back.

Ask your Lion Distributor for complete information about D.H.D. or write to Lion Oil Company, El Dorado, Arkansas.

"Petroleum Promotes Progress"

LION OIL COMPANY

EL DORADO
ARKANSAS



er, and the discharged material was stockpiled so that the shovel might later load the Euclids which hauled it to the road.

The other 25,000 yards came from a sandstone quarry at the west end of the project. After the stone was dug out it was crushed, as was the limestone ledge, by the Cedarapids crusher.

Concrete Pavement

For the concrete pavement the contractor set up a Heltzel batch plant on U. S. 40 at the intersection of the Barnesville Road near the center of the job. Half the concrete on the job was mixed with Medusa air-entraining portland cement. For experimental purposes, the other half was mixed with air-entraining Green Bag Pozzolan produced by Green Bag Cement Co. of Pennsylvania, at Neville Island, Pa.

The pavement is of 9-inch uniform thickness reinforced with steel-bar mats supplied by the Bethlehem Steel Co., which also furnished the hook bolts. Dowel bar supports were furnished by Universal Form Clamp Co., and dowels by Pollak Steel Co. Every 500 to 600 feet when the air temperature was 75 degrees or more, and every 300 to 400 feet when it was below 75, an expansion joint was laid. It consists of a 1-inch pre-molded bituminous filler through which run $\frac{3}{4}$ x 15-inch dowels on 15-inch centers. The contraction joints are at 40-foot intervals, with a 3-inch-deep V left in the surface of the concrete and filled later with asphalt. The adjoining lanes are tied together with hook bolts embedded along the key longitudinal joint on 5-foot centers, and extending 6 inches into the concrete on each side.

Quantities and Personnel

The major items in the contract include the following:

Roadway excavation	786,727 cu. yds.
Channel excavation	17,358 cu. yds.
Tile drain, 4 to 21-inch	46,753 lin. ft.
Paved gutter	30,000 lin. ft.
Seeding and sodding	368,708 sq. yds.
Concrete pavement, 9-inch	72,830 sq. yds.
Blanket course	29,017 cu. yds.

The force employed by A. J. Baltes, Inc., of Norwalk, Ohio, has ranged between 45 and 80, according to the work that was going on, under the direction of Don Bethel, Superintendent. The State has employed 2 soil-compaction inspectors, 2 concrete-control men, one staking crew of 5 men, 7 general inspectors, and a clerk, under the supervision of E. Hodgins Tilton, Project Engineer, and Charles H. Fritche, Division Construction Engineer.

The project is located in Division 11 which is headed by E. R. McCallough, Division Engineer, with headquarters at New Philadelphia. Homer E. Anderson is Chief Engineer of Construction.

New Income-Tax Chart

Revised charts for determining at a glance the new withholding taxes, according to the tax law recently approved by Congress, have been prepared by Delbridge Calculating Systems, Inc., 2505 Sutton Ave., St. Louis 17, Mo. These charts are put out in four editions to cover weekly, bi-weekly, semi-monthly, and monthly payrolls.

The Delbridge charts provide, in addition to the basic data, information on daily deductions for up to 7 days, and for 15 per cent of wages. The chart measures $6\frac{1}{2}$ x $9\frac{1}{2}$ inches, and consists of sixteen cards hinged together.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Cement Co. Appoints Holm

Jens C. Holm has been appointed Director of Engineering for the Marquette Cement Mfg. Co., Chicago, Ill. A. F. Miller, engineering consultant of the firm for 20 years and temporarily Chief Engineer, will continue to serve in a consulting capacity.

Shovel-Yardage Estimator

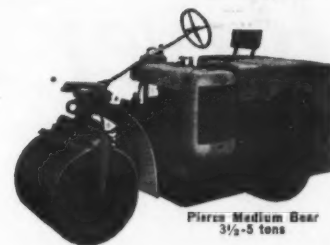
A yardage estimator for shovel and dragline operations has been made up in slide-rule form by The Thew Shovel Co., Lorain, Ohio. It takes into consideration the factors of bucket capacity, degrees of swing, management and job conditions, type of soil, and depth of cut. These are evaluated against each other, and a reading is taken off directly from a scale on the estimator. Hourly shovel yardages are shown on one side, and hourly dragline yardages on the other side.

This estimator is designed as a guide to what yardages might be reasonably expected; it does not provide a means of determining guaranteed output, nor is it to be used as a basis for figuring and bidding jobs. It can be used to indicate yardage increases possible by laying out the job to keep the degrees of swing at a minimum.

These yardage estimators may be obtained from the company. Or use the enclosed Request Card. Circle No. 61.

A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from $3\frac{1}{2}$ to 5 tons with built-in water tanks for ballast and wet rolling.



Pierce Medium Bear
3½-5 tons

The new $2\frac{1}{2}$ -3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within $1\frac{1}{2}$ inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

Pierce-Bear Rollers

Lewis Manufacturing Company
415 Hoefgen Avenue—San Antonio 6, Texas



Pierce Baby Bear
2½-3 tons

TWO-WHEELED TORNADO

Combining lightness, strength and efficiency, this Blue Brute 105' Compressor is built for long years of trouble-free service. And exclusive Feather* Valves get all the air power out of every drop of fuel.

Other Blue Brute Compressors from 30' to 500'.

*Reg. U. S. Pat. Off.

Owner: Plainfield Water Co., Plainfield, N. J.



Owner: Daniel O'Connell's Sons, Inc.
Holyoke, Mass.

FAST, DEPENDABLE PICK-UP

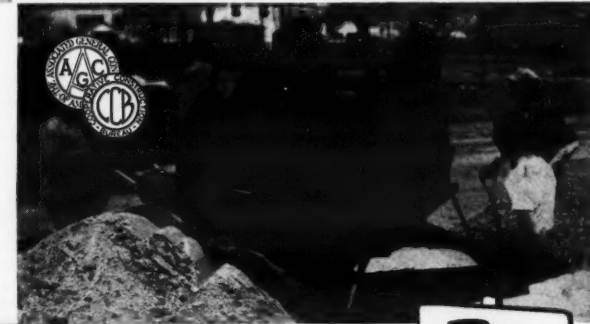
Newest product of Worthington's over 100 years of pump-making, the Blue Brute Contractor's Portable Centrifugal Pump has built-in self-priming and plenty of reserve power. Pneumatic-tired, steel wheels, or base mounted, in a complete range of sizes.



PROFIT-PACKED POWER

Tough, fast-hitting Blue Brute Paving Breakers are light in weight, easy to operate, and do a lot of hard work on very little air. Blue Brute Air Tools also include Hand-Held Rock Drills, Clay and Trench Diggers, Tampers, Sheeting Drivers and Wagon Drills.

Owner: R. W. Meyer, Cadillac, Mich.



Owner: J. J. Romano, Bound Brook, N. J.

QUICK SPOTTING ... MIXING ... DISCHARGING

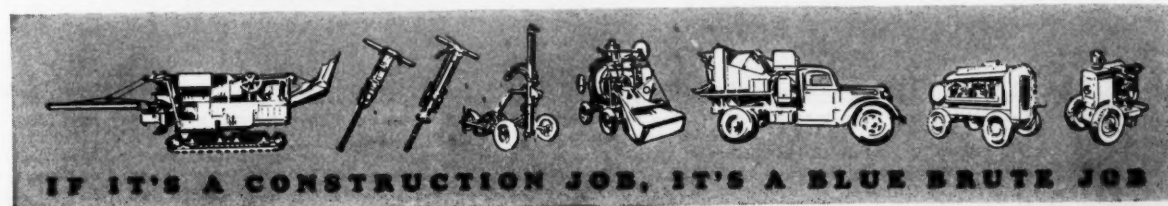
In Blue Brute Portable Concrete Mixers, many advanced features, including Ransome's famous mixing action, add up to more concrete at lower cost. Sizes: $3\frac{1}{2}$ (Tilter or Non-Tilter), 6, 11 and 16 cu. ft. Gasoline engine driven or electric power.



BUY BLUE BRUTES

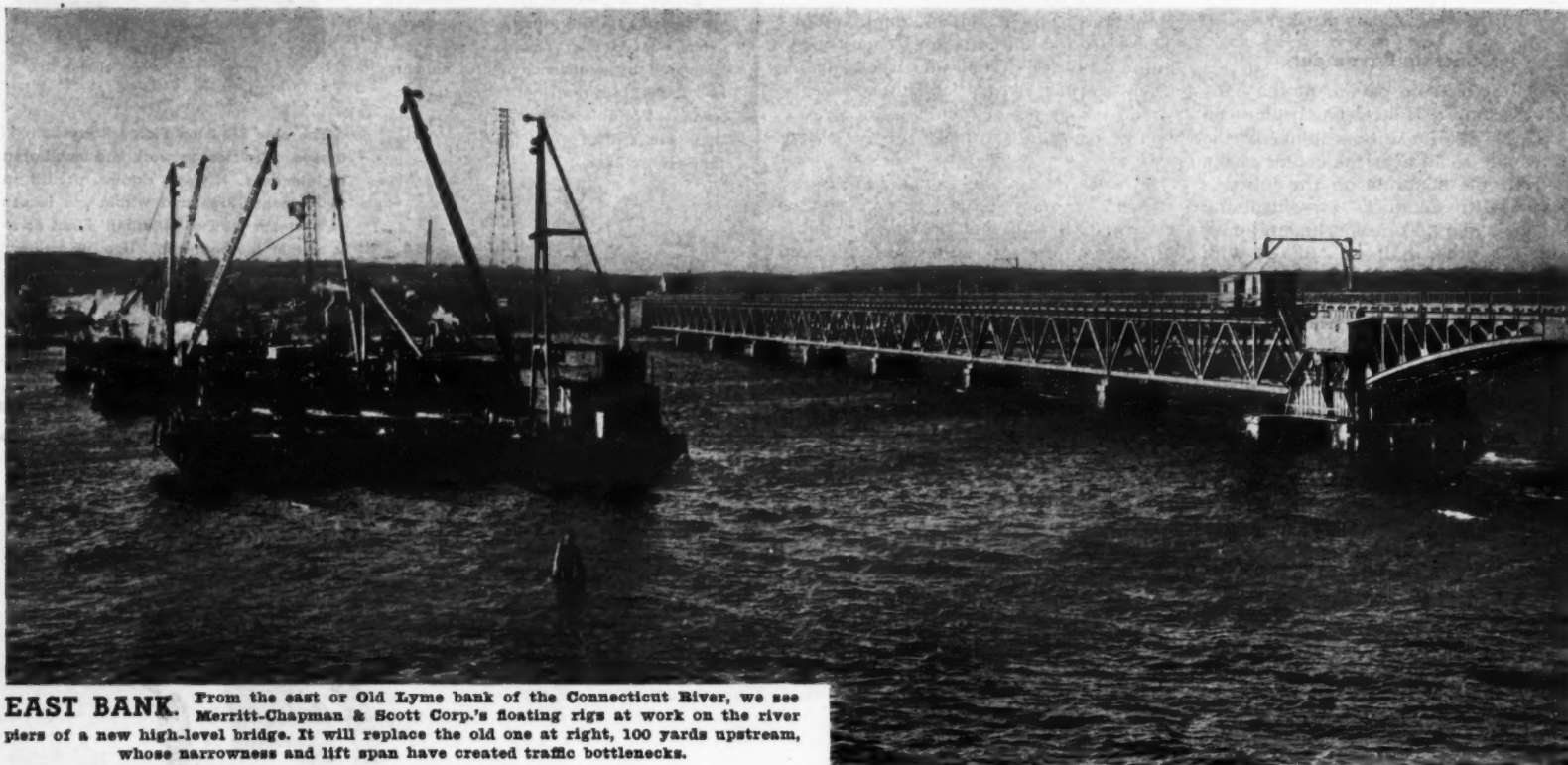
WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass. • Distributors in all principal cities
Your nearby Worthington-Ransome Dealer has the complete line of Blue Brute Construction Equipment. Write for his name.

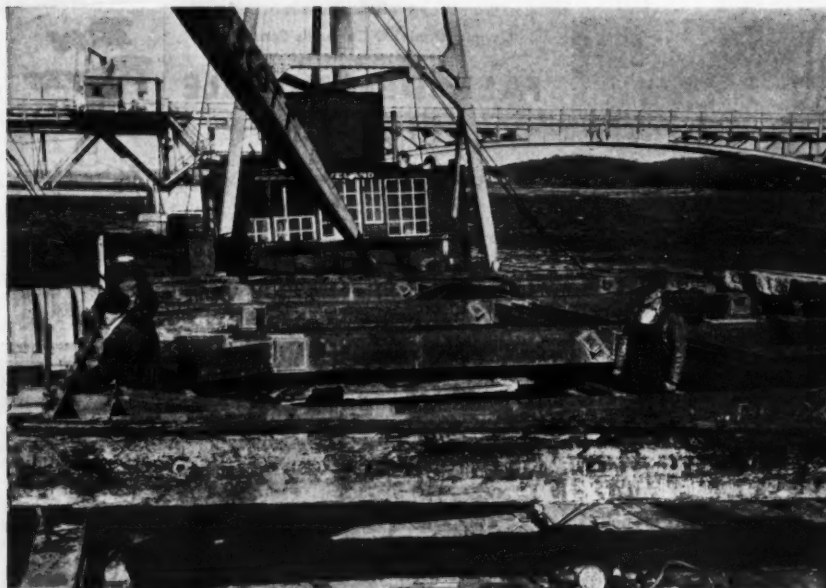


IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

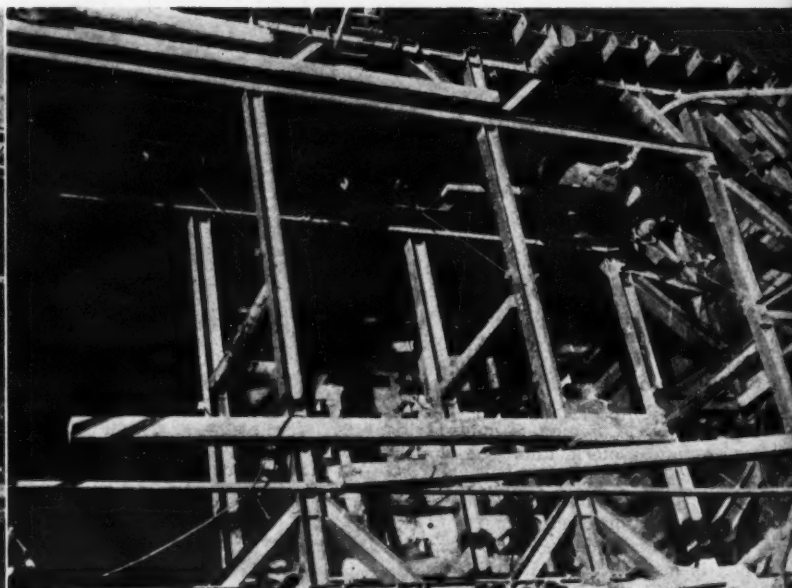
River Piers of Bridge Built From



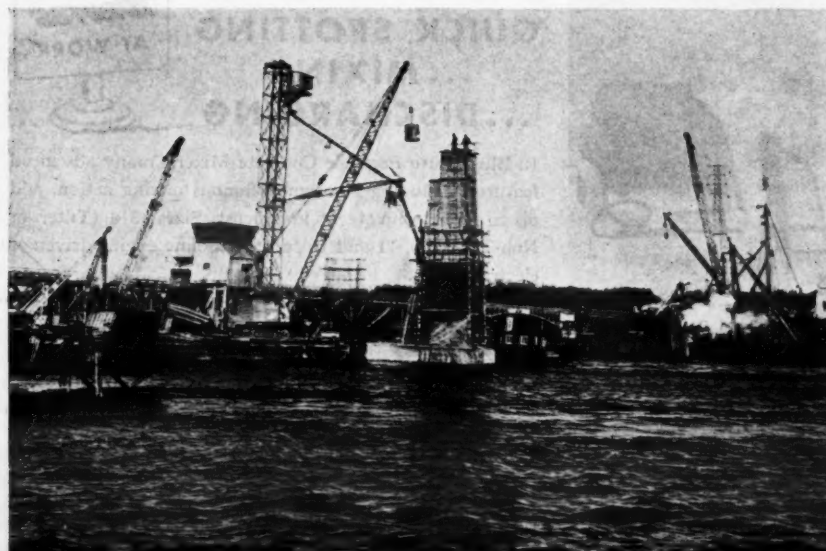
EAST BANK. From the east or Old Lyme bank of the Connecticut River, we see Merritt-Chapman & Scott Corp.'s floating rigs at work on the river piers of a new high-level bridge. It will replace the old one at right, 100 yards upstream, whose narrowness and lift span have created traffic bottlenecks.



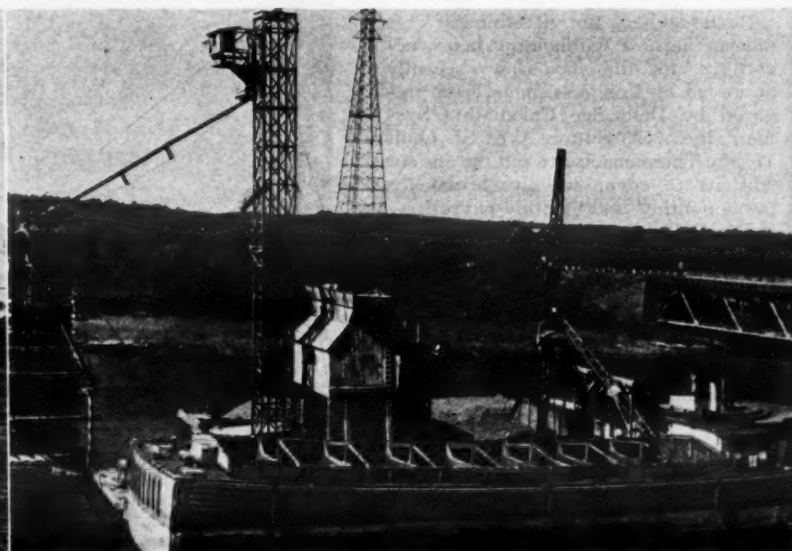
BRACING ASSEMBLED. Meanwhile, on the derrick barge Cleveland, structural-steel framework is assembled for internal cofferdam bracing. The Cleveland—one of several wood-hull lighters on the job—has a 25-ton-capacity derrick with an 80-foot boom.



BRACING IN PLACE. Set in place at pier 5, and with the cofferdam unwatered, the internal bracing framework looks like this; it consists of two levels of steel rangers well reinforced by cross-bracing. The top of the tremie seal can just be seen below the framework.



CONCRETE PLANT. Back on the water again, we see the floating concrete plant working at pier 5. Its Blaw-Knox 105-ton aggregate bin is filled from supply barges by a 2-yard clamshell bucket swinging from the boom of a derrick at the opposite end of the barge.

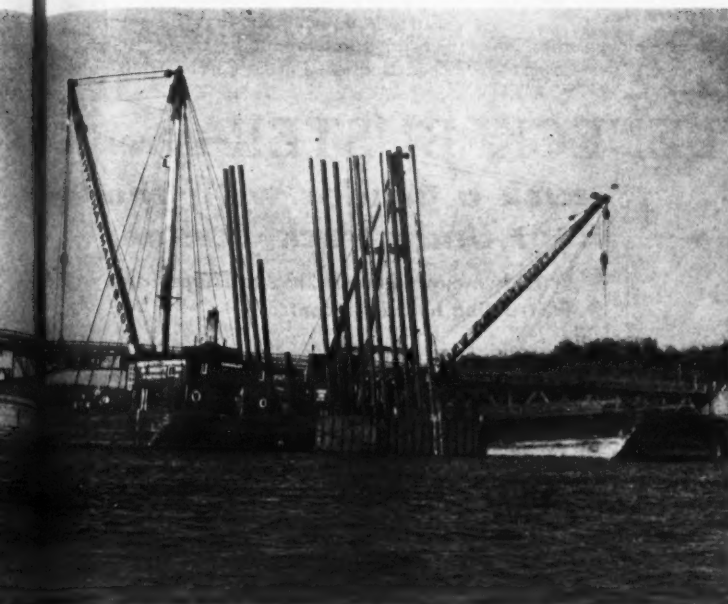


PLANT CLOSE-UP. Here's the floating concrete plant at closer range, with supply barges alongside. From Smith 1-yard mixers under the bin, the concrete is hoisted in a bucket to the top of this 100-foot tower, where it passes from hopper to chute to the bottom of the pour.

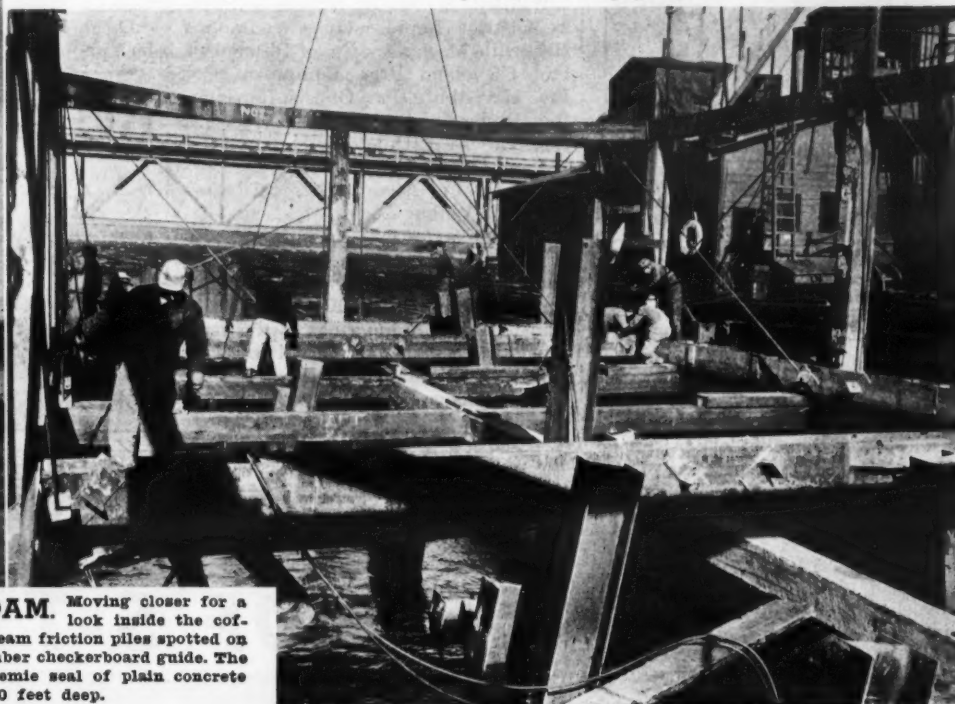
From Floating Rigs

H-Beam Foundation Piles Driven From Derrick Barges, and Concrete Supplied From Floating Plant For Piers of Connecticut River Bridge

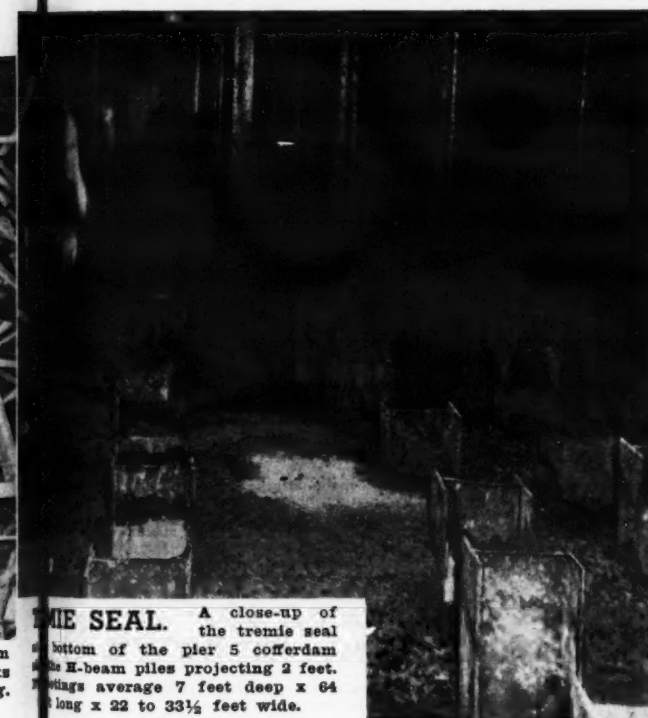
(See article on page 1)



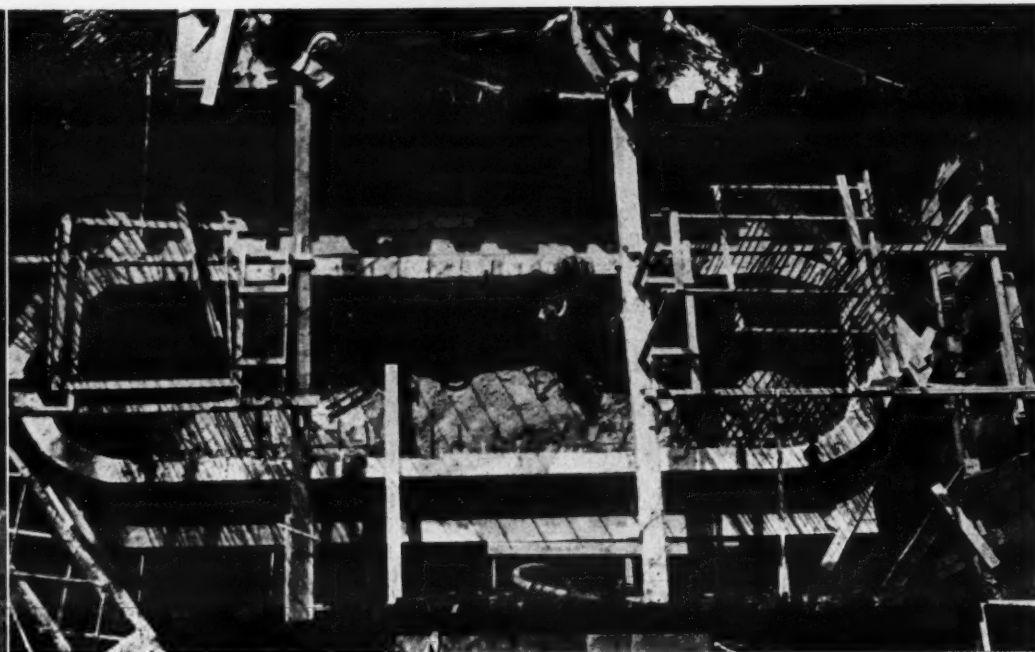
PILE DRIVING. At the steel sheet-piling cofferdam for pier 8, two floating derricks drive 12-inch 53-pound steel H-beam beams to refusal on granite bedrock at minus 130 elevation. The H-beams came in 80-foot lengths and are spliced, when necessary, by welding.



INSIDE COFFERDAM. Moving closer for a look inside the cofferdam at pier 7, we see H-beam friction piles spotted on 3½-foot centers within a timber checkerboard guide. The cofferdam is ready for a tremie seal of plain concrete from 8 to 10 feet deep.



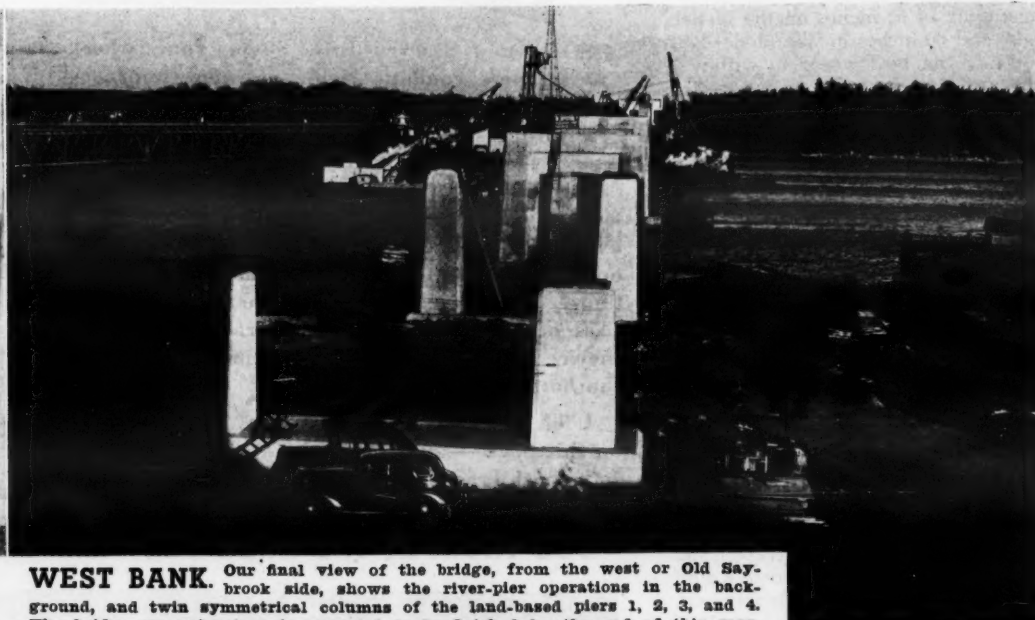
TREMIE SEAL. A close-up of the tremie seal at the bottom of the pier 5 cofferdam. The H-beam piles projecting 2 feet. The sealings average 7 feet deep x 64 inches long x 22 to 33½ feet wide.



DISTRIBUTION BLOCK. When the photo above was taken, the pour on pier 5 had been brought up above the footing to the 12½-foot-thick distribution block. The strip of masonry which encases it from minus 5 to plus 5 elevation will serve as a form for succeeding pours.



PERSONNEL. "Leave my dirty pants out of this picture", says Merritt-Chapman's Superintendent Harold Jenkins. The chap on the right is Colonel Howard S. Ives, Project Engineer for the Connecticut Highway Dept. on the \$1,179,470 contract.



WEST BANK. Our final view of the bridge, from the west or Old Saybrook side, shows the river-pier operations in the background, and twin symmetrical columns of the land-based piers 1, 2, 3, and 4. The bridge superstructure is expected to be finished by the end of this year.



The new Nelson K-5 bucket loader will handle earth, gravel, or broken stone up to 2½ inches, at speeds of about 2 yards a minute. Power is furnished by a 27-hp Le Roi gasoline engine.

Self-Powered Loader Has a 27-Hp Engine

A self-powered bucket loader is made by N. P. Nelson Iron Works, Inc., Dept. 7-B, Clifton, N. J. The company recommends it for use with earth, gravel, or broken stone up to 2½ inches. It is designed to move these materials at speeds of up to 2 yards a minute. Power is furnished by a 27-hp Le Roi gasoline engine.

The Model K-5 loader has a self-steering tow bar for use in hauling over long distances, but it can be driven short distances under its own power. It has a 2-strand elevator and a 4-speed transmission. Separate Twin Disc clutches control traction and elevator. The elevator has an automatic overload release to prevent damage to the machine.

A swiveled chute permits a 180-degree turn from the platform. The buckets have a working capacity of about 650 cubic inches. The feeder consists of toothed spirals, 30 inches in diameter, which pick before they shovel the material into the buckets. The chain speed is 160 feet per minute. The loader has a weight of 7,800 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 40.

New-Style Grab Arms For Use on Lift Truck

A new type of grab arm for use with Hyster pneumatic-tired lift trucks has been developed by the Hyster Co., 2902 Clackamas St., Portland 8, Oreg. It consists of two grab arms designed to squeeze-grip the container being lifted. At present it is made in sizes to fit the Model 20 and Model 40 Hysters.

The Load-Grab arms are hydraulically operated and controlled, and will spread from a minimum of 17 inches to a maximum of 62 inches on the Model No. 20 and 66 inches on the Model No. 40. They can be lowered to within 6 inches of the ground, and a special adapter plate permits lowering them to ground level.

Optional sets of equipment for special application of the device include spike-faced arms for clutching wooden boxes and crates, rubber-faced arms for gentle handling, drum-handling arms for transporting from one to three drums per trip, and conventional pallet arms. Handling capacity of the small model is 1,780 pounds, and 3,350 pounds on the Model No. 40.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 80.

Caterpillar Appointments

Don V. Stone has been named by the Caterpillar Tractor Co. to succeed C. M. "Mack" Adams who has become a staff member of the Advertising Department. Mr. Stone, who since 1946 has been District Representative in Pennsylvania

and New Jersey, will now have the territory which will include Indiana, Kentucky, and parts of Ohio. He will represent the company in contacts with Roy C. Wayne Supply Co. in Louisville, Ky.; MacAllister Machinery Co., Indianapolis, Ind.; and Highway Equipment Co., Cincinnati, Ohio.

William E. McCoy succeeds Stone as District Representative contacting Beckwith Machinery Co. of Pittsburgh, Pa.; Cleveland Bros. Equipment Co., Inc., Harrisburg, Pa.; Giles & Ransome, Inc., Philadelphia; and Smith Tractor & Equipment Co., Union, N. J.

John Davis, Manager of the Caterpillar depot at Atlanta, Ga., will be assisted by Wilbur Legg. Mr. Legg succeeds Ira Taylor, who has been named Manager of the parts depot at Shreveport, La. Roscoe Booker, depot Manager at Kansas City, Kans., has been transferred to Minneapolis in the same capacity. Bill Oedewaldt will be Booker's Assistant Manager. Howard Burgenner has been promoted to Manager of the Kansas City depot.

Dial Scales Listed For Weigh Batches

A dial scale for use with its weigh batchers is now available as optional equipment from the Noble Co., 1860 Seventh St., Oakland 7, Calif. It is made in both semi-automatic and manual models.

On the semi-automatic type, the Noble photo-relay cut-off system goes

into operation as soon as the weight of material, set on the poise beam, is measured out. At this point, the dial scale reads zero, and all other weights measured are cumulative on the dial. The Noble back-balance multiple-beam scale is standard equipment on both manual and semi-automatic batchers.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 85.

BOTTLENECK BUSTER—Every truck a grader with the Root Undertruck Scraper

- Quickly mounted on any 1½ to 10 ton truck
- Fast-action hydraulic control



Building Better Road Machinery Since 1891

ROOT SPRING SCRAPER CO.

547 West North St., Kalamazoo, Mich.



A COMPLETE NEW LINE OF S-TYPE SCRAPERS



NEW
from
DRAWBAR PIN
to
PUSH BUMPER!
BUCYRUS ERIE

These Features Help You Move Greater Yardage At Lower Cost

DROP CENTER FRONT AXLE—Tongue attaches to low part of axle, providing level pull, eliminating the downward thrust that tends to bog down front wheels.

LARGE LOW PRESSURE TIRES, front and rear, provide maximum flotation and conform with specifications recommended by the Tire and Rim Association. Dual rear tires are available as extra equipment.

DOUBLE DISC DRUM TYPE WHEELS mounted on large tapered roller bearings. Strong sturdy construction built to withstand heavy loads and to prevent clogging by mud or dirt.

TWO-PART APRON provides large opening for dumping sticky material, yet can be operated as conventional single piece apron when necessary.

STREAMLINED GOOSE NECK permits short turning radius with ample clearance for front wheels on uneven ground.

DOUBLE CURVE CUTTING EDGE, an exclusive Bucyrus-Erie feature, boils dirt into apron and bowl, uniformly and compactly, requires less horsepower for loading.

POSITIVE ROLLING EJECTION assures full clean dump, requires minimum horsepower.

POSITIVE BOWL RETURN guarantees bowl return to loading position on any slope. Return is actuated by simple lateral torque rod.

SLIDING TYPE BOWL LOCK for use when transporting scraper long distances.

LOW MAIN FRAME provides low center of gravity, low overall height, great stability.

ALLOY STEEL SIDE CUTTERS are castings bolted to main frame, protecting main frame from wear. Castings are reversible to give additional service.

STRAIGHT LINE CABLE REEVING—No side bends in cable lines, only one reverse bend in each cable. Prolongs cable life.

IMPROVED CABLE ANCHORS are cast open-type wedge sockets; easy to lock, will not kink or crush cable.

ADJUSTABLE BAR TYPE PUSH BUMPER is available as extra equipment. Has vertical adjustment to fit push tractor. Long contact bar eliminates jackknifing, assures straight push.

THE new Bucyrus-Erie S-type four wheel scrapers combine a host of new improvements with design features that made Bucyrus-Erie scrapers tops in prewar days. You get the best of the old plus proven new developments—the combination you need for most effective scraper performance, lowest operating and maintenance costs. These new scrapers have been thoroughly tested in the field under actual job conditions. They are built in sizes to correspond to sizes of International Crawler Tractors . . . and they're ready to cut your dirt moving costs to the bone!

Look over the many important features listed on this page—and check with your International Industrial Tractor Distributor. Bucyrus-Erie Co., South Milwaukee, Wisconsin.

See Them at the Road Show!

See Your INTERNATIONAL Industrial Tractor Distributor

S-46 4 cu. yd. (struck)
S-68 6 cu. yd. (struck)
S-91 8 cu. yd. (struck)
S-113 10 cu. yd. (struck)
Also ask for information on these larger Bucyrus-Erie 4-wheel scrapers.
B-170 15 cu. yd. (struck)
B-250 22 cu. yd. (struck)

98T48

Portrait in Print

By Ray Day

Honest Work Still a Success-Getter Says Adolph Teichert of California

IT was a blistering summer day in 1878, and the paving crew was tired. All day long the master bricklayer, arrived recently from the east, had set a killing pace for his helpers. The west drive around California's state capitol at Sacramento was taking shape.

Adolph Teichert, the master bricklayer who was demonstrating the then-new Schillinger patent of paving with concrete slabs, glanced impatiently at tired men half his age. "Hurry up," he urged, "and put some more alum in that mixing water to settle the mud."

"You always want work, more and more work, Mr. Teichert. Don't you ever get tired?" one of the men grumbled.

Teichert's eyes flashed. "Honest work never hurt anybody," he said. "Honest work made America what it is. Her people will have to learn to do even more of it!"

That simple, sound philosophy of 1878 is the guiding principle in the life of Teichert's son, who today is President of the Sacramento firm of A. Teichert & Son, Inc. He is also Vice President of the Associated General Contractors of America. He will, if precedent holds true, be elected President of this nationwide construction organization in 1949.

Adolph Teichert, Jr., believes wholeheartedly in that philosophy of his father's. Not only will it bring success in the construction and engineering business, but Teichert is urging his children to apply it to the fields of music, law, and study.

The old pavement that the elder Teichert laid in the 1870's and '80's is still in place, giving good service. The sidewalk around the Mark Hopkins Hotel in San Francisco was laid by the senior Teichert, and it survived the great earthquake of 1906 to last until today.

And today, the Teichert firm is just as busy on structures which will be giving service years from now. It is helping, under joint-venture contracts, to build such massive barriers as Dorena Dam in Oregon, and Harlan County Dam in Nebraska.

Dam Was Toughest Job

"As a matter of fact, it was a dam that gave us our biggest construction headache," Adolph Teichert, Jr., can now recall, if somewhat wryly.

"When I was considerably younger, we were the successful bidder on North Fork Dam up on the American River above Auburn, Calif. North Fork Dam was one of those fancy constant-radius reinforced-concrete structures, and its design called for some real engineering. Unfortunately, the design contained more engineering than it did mass concrete.

"We had to do the same preparatory work in the riverbed, though, that we'd have had to do if the dam was considerably bigger. We had to contend with

the river, too. By the time we finished with that one, we'd built a fine dam—it's still giving good service—but we lost money on it."

However, the firm has since "guessed right better than 50 per cent of the time", which is Teichert's way of acknowledging his successes. During the war, Teichert crews and equipment swarmed in to build Mather Field, McClelland Field, and other installations. Without exception, Army officers who came to know the Teichert firm respect its President for the skill, the speed, and the honesty his firm displayed when the going was tough.

"Honest Adolph"

In fact, Teichert is known far and wide among his fellow contractors as "Honest Adolph". They tell a story about the time when Teichert and a party of contractor friends were inspecting a job in which they were interested.

Teichert, always a man to notice details in the field, stopped momentarily to examine a piece of masonry. Then he put it back in its place, as carefully as he had picked it up.

Harry A. Dick, of Portland, Oreg., happened to notice. "That's 'Honest Adolph' for you", he said laughing. "Come on, Adolph, don't hold up the progress", he ribbed.

Teichert, many years ago, devised a system of bidding, of accounting and costs, which is as good today as ever. He believes in the contract system of doing work, and he knows that the only way it can function successfully is at a fair profit.

"But it's up to the contractor to figure that profit fairly, and to take his share of the risks", Teichert adds.



Adolph Teichert, Jr., is President of the Sacramento firm of A. Teichert & Son, Inc., founded in 1878 by his father. He is also Vice President of the AGC.

Associates claim that the AGC motto of "Skill, Integrity, Responsibility" just (Continued on next page)

EATON 2-Speed Truck AXLES



Stand up Longer
because Tooth Load
is Distributed over
4 Planetary Gears

With 4 gears to transfer power, the rugged planetary system in the Eaton 2-Speed Truck Axle provides far greater gear tooth contact. Tooth-loads are distributed, and the load on the teeth is held to a minimum. Direct advantages of this design are reduced wear, longer axle life, and minimum upkeep. Outstanding performance records are proof of Eaton quality and design. See your truck dealer for complete information about Eaton 2-Speed Truck Axles.

NEARLY A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

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Portrait of Teichert, Western Contractor

(Continued from preceding page)

about fits the personality and performance of Teichert.

Firm Does Varied Work

Whether the job at hand is a huge dam, a foundation, a piece of road work, or a mere swimming pool—and Teichert still builds good swimming pools—it is carried out in a spirit of honesty and responsibility. For the present head of the Teichert contracting firm is his father's son.

The elder Teichert came to the United States in 1870, and landed in New York. Except for a gold watch and a very small amount of money, Teichert's assets were all in his hands. But those hands were destined to make his living here for quite some time.

Applying his German sense of artistry to masonry work, the senior Teichert was not long in becoming first a journeyman bricklayer, and then a master mason. Shortly after arriving in New York, he had an opportunity to go to California to demonstrate a new technique called the Schillinger patent. It consisted of laying concrete pavement slabs to line and grade, and separating them with expansion joints.

So successful was Teichert in California that in 1878 he founded the present firm of A. Teichert & Son.

That "son" was born in San Francisco. But when he was still an infant, the family moved to Sacramento, where he has lived ever since. At a very early age young Teichert started to work, learning the trade and doing odd jobs on construction work. In those early days much of the work consisted of foundations for buildings and homes. Most of it was subcontracted.

With typical thoroughness, Teichert's father suggested that he get an engineering education to fit him better for the life work ahead. So Teichert went to the University of California at Berkeley, graduating in 1908 with a B.S. degree in civil engineering.

"But I had had my share of hard knocks on field work before my education began, so I knew I didn't exactly have the world by the tail just because I had the degree", Teichert explains smiling.

Coincident with Teichert's graduation and more active participation in the firm, there came a considerable jump in business.

"In 1912, the State called for bids on the third piece of highway ever to be built in California", he recalls today. "I was sent out to run the job. It was tough. I ran the outfit with a time book in one hand and an engineering instrument in the other, so to speak. Authority in those days certainly wasn't decentralized!"

Success in 1912—and in 1948

As a matter of fact, the attitudes which made for success in 1912 will still make for successful contracting in 1948, Teichert thinks.

"Sure it's harder to get started now", he agrees. Then in the same breath he'll add, "But it isn't impossible. For a young fellow just starting in the contract business, the best approach is a tie-in, as a subcontractor, with an established firm."

"But this entrée isn't enough in itself. On his first jobs," Teichert advises, "that young man must give every detail his personal attention 24 hours a day. Make sure that materials arrive on time. See that crews aren't held up for lack of equipment. Make certain that repair parts get out to the job and are installed before the equipment is needed."

Such close personal attention on the part of the aspiring contractor will invariably pay sweet dividends, provided the young man keeps his head,

uses his wits, and, above all, has a sound sense of values. "Contract decisions are largely a matter of balancing intelligently a set of values that change from day to day", he says.

Teichert has more advice, too, about something he has learned the hard way.

"These small contract organizations, if they are managed soundly, have a way of catching on", he says. "The firm grows. The man makes good wages to start, and soon his profits mount. By and by he's got a home, a nice car, and has married himself a beautiful girl."

"Thinking that nothing succeeds like success, he decides the time has come to expand the business, to take two or three jobs instead of one. But right here is where the trouble starts if he

isn't a sound manager. For the minute he hires someone else to run his job, and can no longer give it all his personal attention, unit costs start to rise. Little mistakes that he has steered clear of start to appear. A load of lumber or a tank of asphalt fails to get out to the job, and a crew's wages are largely wasted.

"As the field costs go up, profits come down. By and by there comes a job where costs overbalance the receipts, and all the hard work of years is wasted. More and more, the crying need on construction work is for a return of some of the old-time craftsmanship and spirit of work. Until it comes back, contractors must be very cautious indeed in hiring superintendents or associates."

Hard work and attention to duty are just as important to the individual crew member as to the superintendent, he believes. The good equipment operator who is willing to learn something about methods of construction stands an excellent chance of moving up to foreman. Then, if he is willing to broaden his knowledge further, he can rise to a superintendent's niche. If he continues in the same spirit, there is no limit to how far a man can go in the construction business.

Hard Work

At the age of 63, highly successful in business and private life, Teichert still works about as hard as ever. Keeping at it from early morning until midnight

(Concluded on next page)

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or later is still the rule with him. In the hallway of his fine Spanish type of home on the outskirts of Sacramento is a large blackboard, where Mrs. Teichert or Nancy, his high-school-age daughter, can chalk down telephone messages or miscellaneous memoranda.

Recognizing also his responsibility to the Associated General Contractors of America, he is never too busy to make a trip to Washington, to Chicago, or wherever else the business of that organization calls him. Whenever possible, he tries to tie these trips in with a personal field inspection of the construction work his firm is doing over the country.

Teichert's appearance belies his capacity for work. He is medium-sized rather than burly. He is quiet and

mild-mannered. Friends say he seldom gets outwardly excited. While he can be firm in dealing with personnel situations, his quiet disposition makes him seem more like a studious professor of engineering than a successful practitioner of it.

His eldest son, Frederick Q. Teichert, was well known in the west prior to his untimely death in 1944. Teichert has never quite reconciled himself to that blow. Much of the work he does these days, under lights, is the sort of engineering and estimating his son would be doing if he were alive.

His other children, too, show great promise. A. H. Teichert, studying in New York City, is developing his talents in piano, and is scheduled to give a concert soon. Henry, a younger son, is

studying law at the University of California at Berkeley. And Nancy, the youngest, has perhaps more pep than all the family combined. She is an expert equestrienne, makes good grades in high school, and can talk double Dutch and various other scrambled forms of the King's English—"none, absolutely none, of which will be worth a hoot to her in later life", according to her father.

There is still another member of the family, and according to Toastmaster Dan W. Kimball at the last AGC banquet, she is the most important member. Kimball claims that the AGC elected Teichert an officer so Mrs. Teichert would be certain to attend the meetings.

Tall and slender, with a taste for

clothes which is equal to her beauty, Mrs. Teichert is every bit a match for her well known husband. They have not been married so long. Teichert met her at a neighborhood party after his first wife's death, and this chance encounter has since culminated in a happy marriage.

The Teicherts love animals. Nancy has her own horse, and the household cat has learned to tolerate the latest addition to the family, a pedigreed Welsh terrier by the name of Rhordri Mawr.

Golf for Relaxation

Teichert's one form of relaxation from arduous work is golf. He is proficient at it, shooting 18 holes in the low 80's. He tries to get out once or twice each week, not only for the companionship of friends, but for the exercise that walking gives him.

His life at home is peaceful and serene, except perhaps when Nancy pesters him for help in getting her driver's license. He has a host of friends, since he has been active in Sacramento community affairs for many years. He was one of the earliest advocates for the Port of Sacramento, and the work which was started after the first World War may soon be expanded still further.

He is also a Past President of the Sacramento Chamber of Commerce, the Community Chest, the YMCA, the Exchange Club, and is a committee member of the California Chamber of Commerce. He belongs to the Rotary Club and several Masonic organizations. He also serves on the various AGC committees of the Northern California Chapter of AGC.

Despite this wide association—or perhaps because of it—his memory for names is none too good. To help out at opportune times, Teichert carries a small notebook, cross-indexed so formidably that only he can understand it. He is always on the alert for hard-working serious young engineers or construction men. And when he finds the occasional man who is willing to work hard, Teichert sometimes gives him a chance in the firm.

"It's fine to start at the bottom," he declares, "but a man can stay at the bottom too long. He shouldn't be held there. He ought to advance just as rapidly as he can get ready for more work and more responsibility."

Teichert shares a belief that is part of the American heritage—that the only justification for increased wages is more productivity. In his own organization he is never too busy to listen to new ideas for increased production, or an easier way to do work.

Occasionally, too, he surprises his men by reverting to the kind of supervision he gave the outfit back in 1912. A few weeks ago, after he was elected Vice President of the AGC, he walked through his Sacramento equipment yard making what appeared to be an entirely casual visit.

"Mr. Teichert's sure busy these days", said a grease monkey to a mechanic. "Wonder how he finds time to mosey around out here in the yard with those scrapers."

Thirty minutes later, the master mechanic was called to the office on business. After discussing with him the selection of machines to be shipped out to the next job, Teichert disarmingly added, "And say, Joe, by the way, those scrapers and that old sheepsfoot roller out in the yard haven't been looked after for some time. I notice the grease monkey has time to visit. Better have him give that equipment a good greasing!"

Teichert has made no promises, for the record, about what he will do for the Associated General Contractors of America organization. But the chances are that if the AGC has grease fittings, it will run the smoother for his grease gun, of skill, experience, and integrity.

AT THE A.R.B.A. ROAD SHOW



Industrial Power



County Maintenance Equipment Surveyed

Data on Numbers, Kinds, and Costs Of Units Used by Typical Counties Compared With Data on States

A COMPARISON of the maintenance equipment used by county and state highway departments has been made by the Public Roads Administration. The statistics were included in a report by J. S. Bright, Deputy Commissioner of the PRA, speaking at the County Engineers' meeting of the American Road Builders' Conference in Washington, D. C., in January. They provide highway-department officials with a convenient means of comparing their present equipment set-ups with the average. The figures may also be a guide to establishing or revising new equipment inventories.

The field divisions of the PRA were asked to observe counties in which maintenance work was well organized and the roads well maintained. Twenty-eight such counties, well distributed throughout the United States, were selected. Data were obtained from them regarding mileage and types of surfaces maintained, equipment inventories, average annual maintenance expenditures, and personnel employed. The information was used as the basis for comparisons with state figures.

Types of Roads Maintained

It should be explained first of all that the types of surfaces maintained by the counties and states differ in percent-

ages. Fifty-seven per cent of the county roads are non-surfaced, while 58 per cent of the state roads are of low-type bitumens or better. Thirty-five per cent of the county roads are soil-aggregate, largely gravel-surfaced, as compared with 25 per cent of the state roads. These variations in types are adequate reasons, Mr. Bright pointed out, for the differences reported in equipment usage, inventories, men employed, and dollars expended on the two road systems.

Total Equipment Investment

The equipment inventories of all state highway departments disclosed the use of mechanical units at an estimated cost, when new, of \$365,000,000 to perform an annual average \$356,000,000 maintenance program. The 28 counties used mechanical units at a cost when new of \$7,700,000 to perform \$6,000,000 of maintenance work. Reduced to smaller figures, an equipment investment of \$1.02 was involved for one dollar of state maintenance performance, and \$1.28 for one dollar of county maintenance performance. However, this analysis is not complete without linking it to the types of roads under maintenance, traffic count, quantity of labor required for the maintenance operations, and similar considerations.

Mileage, Cost, Personnel

The survey of the 28 representative counties revealed also that the average county maintains 1,100 miles of highway at an annual cost of \$217,000 or \$197 per mile, with an average of 75 men to carry out all categories of the work. Equivalent figures for state highway departments show that the average state maintains 11,320 miles of

Equipment Used by Average County and State Highway Maintenance Departments Per 1,000 Miles of Highway

Type of Equipment	County		State	
	Number of Units	Estimated Cost, New	Number of Units	Estimated Cost, New
Automobiles, 1/2-ton pick-up truck	5	\$ 8,000	19	\$ 30,400
Air compressors	2	10,000	3	15,000
Crushing plants	1	15,000	1	15,000
Graders, motor	7	\$6,000	12	96,000
Graders, tow	2	6,000	10	30,000
Loaders	1	2,500	3	7,500
Maintainers	2	2,000	1	1,000
Mixers	2	3,600	4	7,200
Mowers	3	4,500	9	13,500
Rollers	2	10,000	6	30,000
Shovels, power (cranes, etc.)	1	13,000	2	26,000
Snow plows (displacement types)	10*	10,000	43*	45,000
Tractors, crawler and wheel	5	27,500	10	55,000
Trucks, 1 1/2 to 2-ton	22	44,000	16	32,000
Trucks, over 2-ton	5	20,500	44	198,000
Trailers	2	5,000	3	7,500
Welding machines	1	2,600	1	2,600
Subtotal	73		189	
Other major and unclassified equipment	9	13,250	51	56,750
Total	82	\$253,450	240	\$668,450
Total average maintenance expenditure		\$197,000		\$655,000
Ratio of equipment cost, new, to expenditure		\$1.28		\$1.02

*Northern areas

road at an average annual cost of \$7,-420,000 or \$655 per mile, with an average of 1,980 men to carry out all categories of the work.

The fact that the state's expenditures per man exceeds that of the county by 29 per cent might be indicative of a (Concluded on next page)

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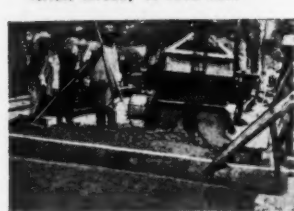
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higher mechanical productivity on the part of the state employee. This reasoning, however, said Mr. Bright, must be modified by such factors as amount and cost of materials used, ratio of skilled and unskilled labor, equipment operators, types of surfaces, and other items peculiar to the county and state work.

Use of Equipment

Perhaps it is most useful to compare the equipment usage and equipment inventories of county and state. The number of principal types of units which the average county and state highway department use in performing their maintenance work is indicated in the accompanying table. Also shown is the estimated cost of the equipment when new, and the ratio of the total equipment cost to the average maintenance expenditure by each agency. It is interesting that the ratio for counties exceeds that for states 25 per cent.

The number of units of equipment operated by the average county for maintenance work is about one-third of that used by the state. Expenditures for maintenance work by the county for each piece of equipment average \$2,410. A similar figure for the state is \$2,730, or a ratio of 1.00 to 1.13. The county uses one equipment unit for 12.2 miles of highway, while the state has one unit for 4.2 miles of road.

Equipment "Package"

The equipment units listed in the table may appropriately be called the equipment "package" now used by the average representative county and state for maintaining all roads under their respective jurisdiction; however, the number of units will, of course, vary somewhat with the types of surfaces maintained. The productivity of the maintenance dollar can be increased, Mr. Bright pointed out, by having a well balanced equipment package.

It can also be increased by having equipment in proper working condition. One county engineer in the survey indicated that his equipment inventory contains many antiquated units. And he said further that if funds were available to provide suitable equipment replacements, the present highway maintenance cost could be lowered at least 10 per cent. This saving alone would replace in 6 years about 50 per cent of all worn-out equipment, based on a 6-year life for equipment.

Statistics in the manufacturing industries disclose an average increase in output per man of about 3 per cent a year, said Mr. Bright. And this has been effected largely by improvement in the types of equipment used and by further adaptation of equipment to needs. Increased use of mechanical methods in performing maintenance work appears to be the principal means of catching up with present highway maintenance requirements.

Magnetic Level Gage

A magnetized level gage has been announced by The Buckeye Plastic Corp., 1220 Huron Road, Cleveland 15, Ohio. The Magno Level is constructed with two permanent magnets to hold it to any flat or round magnetic surface. This, the manufacturer points out, leaves both hands free for lining up, straightening, or fastening work in place. In addition, a calibrated dial shows the angle from the level of any surface.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 83.

Wayne Crane Names Gifford

Samuel H. Gifford has been appointed a Sales Representative of the Wayne Crane Division of the American Steel Dredge Co. Inc. Mr. Gifford will take over some of the western territories of this Fort Wayne, Ind., concern.

Seeding Equipment

A lime and fertilizer spreader and a land roller for use in roadside-development operations are made by Judson Bros. Co., Collegeville, Pa. The spreader is built in a standard 8-foot size, and is said to spread evenly at rates of from 150 to 8,000 pounds per acre, according to the type of material being spread. Features of the unit include complete feed control from the tractor seat, rotary-wing force feed with added sweep bars, slide plate designed to prevent leakage, waterproof hopper cover, pressure grease fittings, and 12-bushel capacity.

The Judson company also makes a three-section steel land roller. It is 8 feet in length and weighs 520 pounds. The rollers are 24 inches in diameter and turn on six roller bearings. They are made of 12-gage high-tensile-strength steel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.



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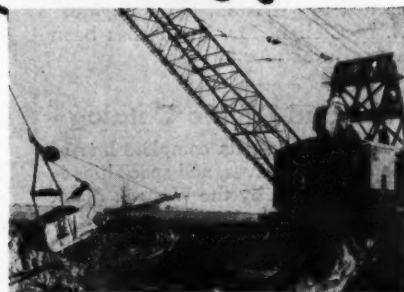
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Convention Calendar

July 16-24—ARBA Road Show

Road Show, American Road Builders' Association, Soldier Field, Chicago, Ill. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D.C.

July 21-23—ASCE Meeting

Summer convention, American Society of Civil Engineers, Olympic Hotel, Seattle, Wash. Col. William N. Carey, Executive Secretary, 33 W. 39th St., New York 18, N.Y.

Oct. 2-10—Construction Exposition

Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc. L. W. Duddleston, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

Planning for Safety Discussed at Meeting

A symposium on safety in construction was held recently in connection with the Greater New York Safety Council's annual convention. The meeting took place in the Hotel Pennsylvania on April 13, and was presided over by Walter J. Byrne, consulting engineer with offices in New York City.

Featured on the program was a skit depicting a job-safety planning conference attended by a safety engineer, general contractor, and general superintendent. These men discussed the safety features involved in setting up a typical concrete ready-mix plant and storage area, placing concrete in high wall forms, and in stripping wall sections.

M. C. Stowe, of Johnson, Drake & Piper, New York City, represented the general contractor; Charles Wilkie, H. K. Ferguson Co., New York City, represented a general superintendent; and Robert L. Moore, Senior Engineer, Construction Section, National Safety Council, presented the point of view of the safety engineer.

Reclamation Chief Retires

Walker R. Young, Chief Engineer of the Bureau of Reclamation for the past three years, has announced his retirement to take effect June 30. He will be succeeded by Assistant Chief Engineer L. N. McClellan. Mr. Young has been with the Bureau for 37 years.

Block-and-Tackle Catalog

A catalog listing its complete line of tackle blocks, sheaves, and specialties is being distributed by the Western Block Co., Lockport, N. Y. Catalog No. 45 is heavy-bound and contains 131 pages of facts and figures on the Western line. Among the major types of equipment which this company provides are blocks for manila rope, blocks for wire rope, sheaves, and related accessories and hardware.

The catalog contains an illustration of each type of equipment, accompanied by a complete listing of sizes and styles in which it is supplied. Engineering data

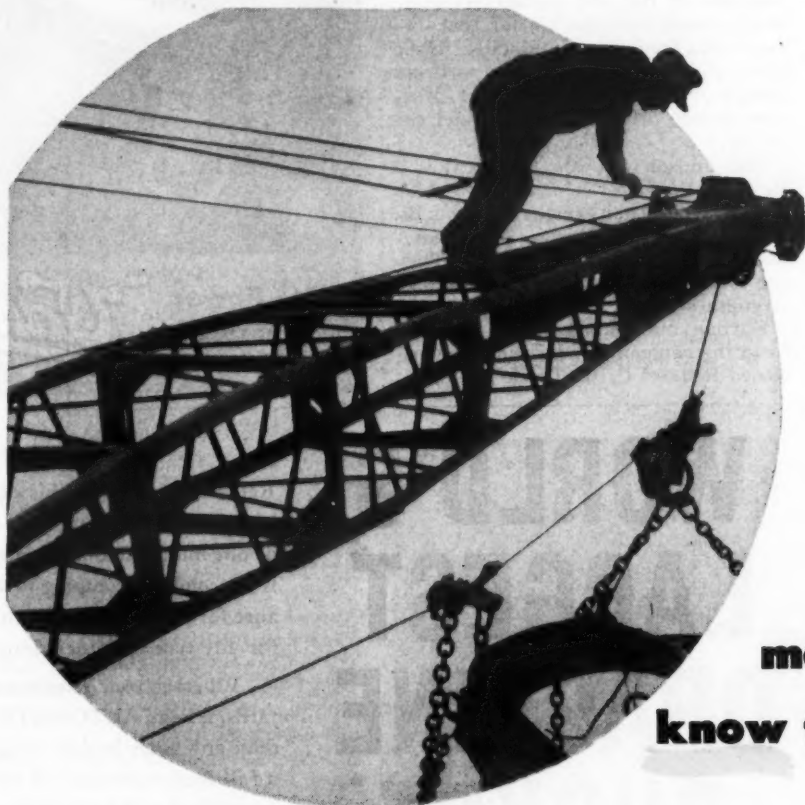
provided in the catalog cover stress factors on snatch blocks at various angles, how to reeve tackle blocks, working loads for rope, and how to order. The book has a thumb-tabulated reference, plus a complete index.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 54.

Homestead Advances Three

The Homestead Valve Mfg. Co. has announced the appointment of three additional representatives for its Hypressure Jenny steam cleaners, compounds, and accessories. Richard Haupt will cover most of Wisconsin and the upper Michigan peninsula as Factory

Representative. Robert E. McCarthy will be Factory Representative in Nebraska and Iowa. And Jack Westhead is the new Special Field Representative to co-ordinate the activities of the field men and the Homestead factory. He replaces Clair W. Rodgers, who is now a Factory Representative in northern California and Nevada.



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A NEW link of reinforced-concrete pavement, 4.6 miles long, has been constructed on the highway encircling Indianapolis on the north and east in Marion County, Ind. This section of State Route 534 replaces a part-gravel and part-bituminous road, 20 feet wide, running from State Route 29 to the intersection of State Route 431 at the town of Nora. Construction was performed by the McCalman Construction Co. of Danville, Ill., under a \$404,572 contract to the State Highway Commission of Indiana.

The same company is also building another section of State Route 534 along Shadeland Avenue from 56th Street south to U. S. 40, a distance of 5.1 miles. The contract price for this stretch is \$387,489. Both pavements are 24 feet wide. A 2-foot black center-line stripe was constructed on the first project, experimentally, as a safety measure to keep opposing traffic on its own side of the road.

Grading for the job at Nora started in July, 1946, and paving got under way in September of that year. Late-autumn rains, however, brought construction to a halt early in November, after 2.2 miles of paving had been completed. Because of the continuing wet weather in the spring of 1947, paving was not resumed until June 16. The concrete work was finished in July. On the Shadeland Avenue contract the grading got started in the spring of 1947, and all of the job was paved before winter set in. The contract was scheduled for completion in the spring of this year.

Grading

On the Nora job, which is the subject of this article, the grading consisted of moving dirt from one part of the road to the other to balance out the cuts and fills. No borrow for common excavation was required. For hauls up to 2,200 feet, the material was moved by four Super C Tournapulls hooked to LeTourneau LP Carryalls averaging 12 yards a load. On hauls under 1,000 feet two LP Carryalls pulled by Caterpillar D8 tractors also averaged 12 yards a load. A D8 pusher tractor helped to load the machines.

On the fills the dirt was spread in 6-inch lifts by a D7 dozer and compacted by a LeTourneau sheepsfoot roller pulled by another D7. When necessary, the material was wet down with water pumped from a near-by creek and distributed from a 1,500-gallon tank truck. An Austin-Western 10-ton 3-wheel roller also was used in the compaction.

Where the fills are over 5 feet high the slopes are 2 to 1, but under 5 feet they are 4 to 1. In cuts up to 10 feet the slopes are 4 to 1, and above that they are 2 to 1. The 10-foot shoulders are sloped 1 inch per foot, and were wide enough to permit the paver to work outside the forms.

Granular material for the special subgrade treatment was purchased from the Central Sand & Gravel Co. which delivered it to the job from its pit on Route 534, an average haul of 2.4 miles. The combination sand and gravel mix was end-dumped from trucks over the subgrade. It was spread out and shaped by a Caterpillar No. 12 motor grader to a width of 26 feet, or a foot beyond the width of pavement on each side. In a few cuts, as much as 12 inches of material was laid, but the average section was 5 inches at the center and 6 inches at the edges. It was compacted by the

10-ton 3-wheel roller. The pit-run gravel met the following requirements for special subgrade treatment:

Retained on the 2-inch sieve	0-5 per cent
Retained on the No. 4 sieve	0-65 per cent

The fraction passing the No. 200 sieve could not be greater than one-half the fraction passing the No. 30 sieve, nor greater than one-fourth the fraction retained on the No. 30 sieve; but no material was rejected on account of the amount passing the No. 200 sieve, provided such amount did not exceed 10 per cent.

Batch Plant

As the grading progressed, a concrete batch plant was set up in Nora, at the eastern end of the job where the Monon Route railroad crosses Route 534. On a



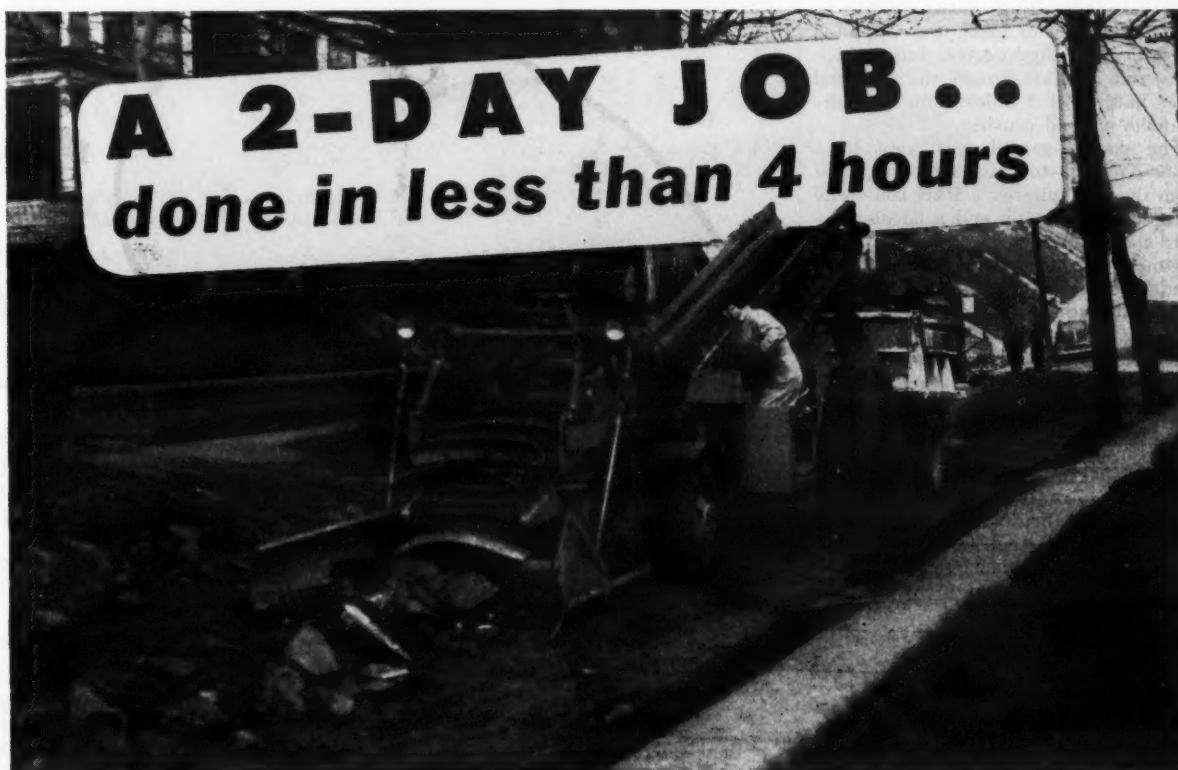
C. & E. M. Photo

A MultiFoote 34-E Duomix paver empties a bucket of concrete between the forms in front of a Blaw-Knox spreader. From 800 to 1,000 feet of 24-foot-wide concrete was usual production on the McCalman Co. job in a 9-hour day.

siding just north of the road, a Heltzel 100-barrel cement bin was erected for storing the Lone Star air-entraining cement which was shipped in bulk cars from the mill at Limesdale, Ind. A com-

bination of worm gear under the track and an enclosed bucket elevator raised the cement to the bin. There it was weighed out on a Kron dial scale as

(Continued on next page)



This Athey Force-Feed Loader was used to load ripped up asphalt from a 650-foot block of 25-foot paving, 3" thick, for the Allegheny Paving & Asphalt Co., in Pittsburgh, Pa. Normally, the job would take two full working days, but with the Athey Loader's high production, it was cleaned up and hauled away in 3 hours and 40 minutes!

The owner reports, "Even this record could have been beaten had we added another 4-yard truck to our fleet to haul the material away faster."

Because of the exclusive "floating-

feeder" principle, the Athey Force-Feed Loader is the only machine that will keep a continuous flow of hard-to-handle material discharging into trucks, at a rate up to 5 cu. yds. per minute.

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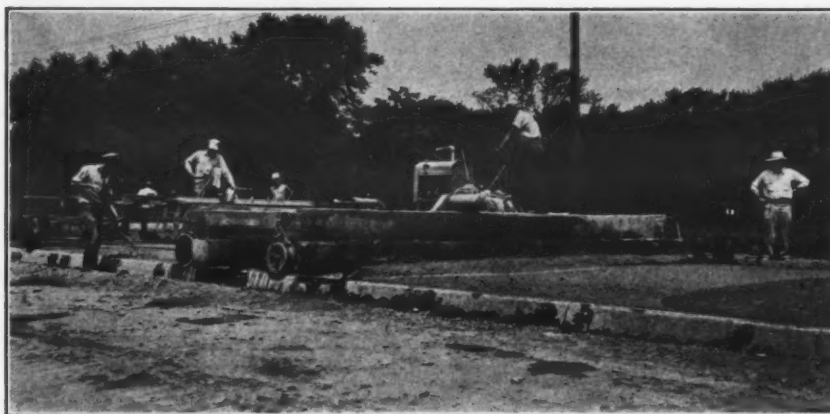
MOBILOADERS



FORGED-TRAK TRAILERS



RUBBER-TIRED TRAILERS



Wide Shoulder Helps Paver on Road Job

(Continued from preceding page)

the batch trucks pulled under for a load.

Not enough space was available near the cement bin for aggregate storage, so the rest of the plant had to be located on the south side of the highway. The aggregate, consisting of two grades of gravel and one of sand, was supplied by American Aggregates, Inc., which delivered and stockpiled the material after hauling it 2 miles from its Indianapolis pit and crusher.

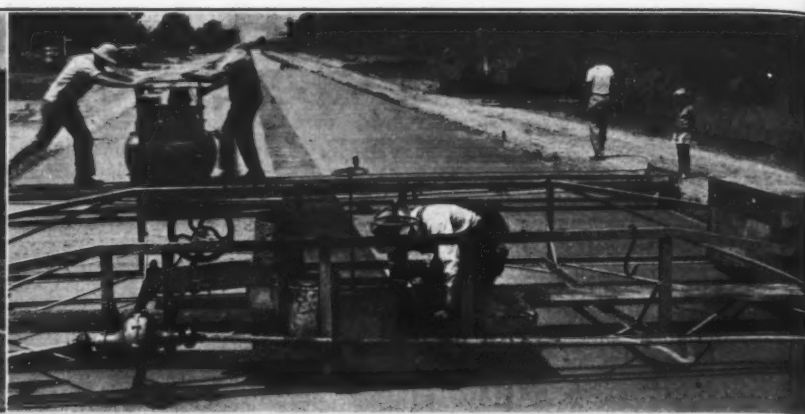
The coarse gravel was kept in a Blaw-Knox 30-ton bin. This was filled from the stockpile by a P&H 206 crane with a 40-foot boom and a Kiesler 3/4-yard clamshell bucket. A 25-ton 2-compartment bin for the fine gravel and sand was serviced by a Lorain crane equipped with a 45-foot boom and a Williams 1-yard clamshell bucket. The ingredients for the concrete were hauled to the paver in from 5 to 18 trucks, depending on the length of haul. The trucks held two batches each and were hired on a batch-haul basis.

The usual procedure for the trucks was first to pull under the coarse-aggregate bin, then back under the fine-gravel and sand bin. Then the trucks crossed the road, ran under the cement bin for a load, swung around in a loop to get back on the road, and set out for the paver. When nearing the paver the trucks turned around, and backed down the shoulder on which the paver was working. No other traffic used the road as the pavement was being laid for the full 24-foot width.

Paving Preparations

Paving started at the west end of the

job at the intersection with State Route 29, and proceeded east in the direction of the batch plant. The subgrade was given a final shaping by the motor grader before the Metaform 9-inch steel road forms were set by hand. On the job were over 3,000 feet of forms, and from 700 to 800 feet were always set to line and grade ahead of the paver. Following the grader came a planer pulled by a D6 tractor. It cut the subgrade to true cross section for a 9-7-9-inch pavement. From the edges of the pave-

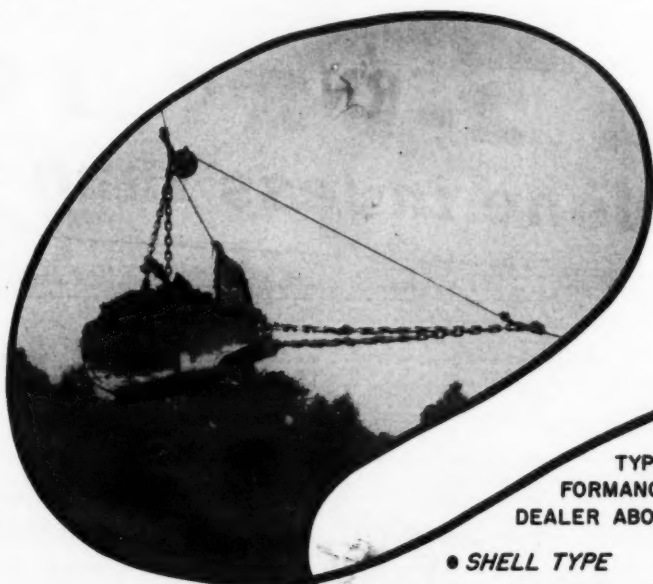


C. & E. M. Photos

Riding on Metaform steel road forms, a Jaeger-Lakewood double-screed finisher (left) makes a couple of passes over the concrete on Indiana State Route 534. At right is the bridge from which a 2-foot black centerline was floated into the concrete, and the bridge from which Richkure was applied from a Chausse spray machine.

ment the depth of slab decreases 2 inches in 2 feet. The surface has a center crown of 1 1/2 inches.

(Continued on next page)



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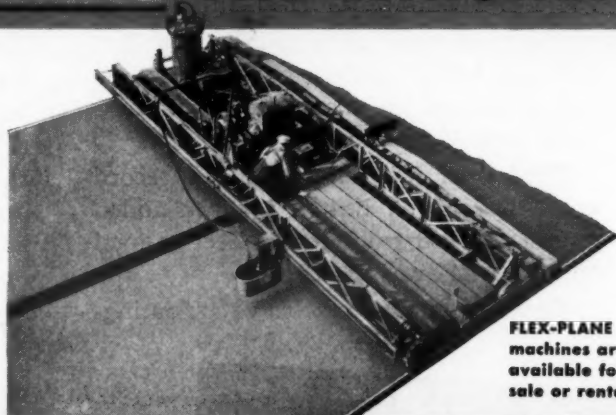
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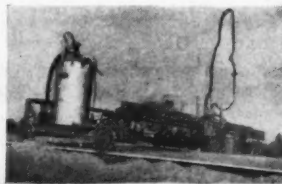
MECHANIZE BEHIND THE FINISHER

For years contractors have emphasized speed at the paver and finisher—and they got it! But, brooming, belting or dragging burlap, installing permanent traffic lines and spray curing often lagged because of the fast pace ahead. Now, a Flex-Plane machine can solve these problems by handling all operations, individually or in combination. For full information, return coupon from this ad.



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THE FLEX-PLANE AUTOMATIC SPRAY MACHINE—An example of mechanization behind the finisher. Completely automatic, many contractors are finding it reduces costs. Its perfectly even, controlled coating eliminates all waste of expensive material.



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for contractors, highway officials and distributors wanting further details or printed matter from the manufacturers advertising in these pages. Our Reader Service Department will be glad to forward any literature or special requests you mail to us at the above address.

CONTRACTORS AND ENGINEERS MONTHLY

After the planer, the subgrade was rolled by an Austin-Western 5-ton tandem roller, and the depth was checked with a scratch template. If dry, the ground was wet down and the forms were then oiled.

The road has no expansion joints down its length. But where intersecting roads were met, a 1-inch fiber joint was butted against the sides of the slab. Every 40 feet a Laclede contraction-joint assembly was installed which held smooth dowels, $\frac{3}{4}$ x 24-inch, on 12-inch centers across the slab. The dowels were painted and greased before any concrete was poured.

Concreting Operations

The batches were mixed in a Multi-Foote 34-E Duomix paver equipped with a 35-foot boom. A batch was mixed for one minute—37 seconds in the first drum and 23 seconds in the second drum. Water for the concrete was tapped from Indianapolis fire hydrants and hauled to the job in a 1,500-gallon tank mounted on a Reo truck. On the truck was mounted a Gorman-Rupp 2-inch pump which transferred the water to a 1,500-gallon trailer-mounted tank pulled along by the paver. A similar pump on the paver drew the water from the trailer tank to the paver tank. In this manner a constant supply of water was always available at the paver.

As the batches were deposited on the subgrade the concrete was struck off and leveled by a Blaw-Knox paddle-type spreader, at the rear of which was a Jackson vibrator. At the first pass the concrete was left low to receive the wire-mesh reinforcement which came from the Chicago steel plant of Jones & Laughlin by rail to the railroad siding at Nora. Before the mesh was set in place, a worker from the rear end of the spreader laid down deformed bars, $\frac{3}{8}$ x 48-inch, on 5-foot centers along the longitudinal center line and perpendicular to the side of the pavement. The dowels or tie bars were laid $3\frac{1}{2}$ inches below the top of concrete, while the mesh was placed over them, or about 2 inches below the surface. More concrete was then dumped over the steel and leveled even with the top of the forms by a second pass of the Blaw-Knox spreader.

Behind the spreader came a Jaeger-Lakewood double-screed finishing machine which made a couple of passes over the concrete. Following along was a Flex-Plane machine which inserted a bituminous ribbon, $\frac{1}{8}$ x 3-inch, into the concrete along the longitudinal center line. This machine also cut the transverse contraction joints into which were inserted $\frac{1}{4}$ x 2 $\frac{1}{2}$ -inch steel strips which came in two sections for the full width of slab. As these were set, the operator of the machine stuck a dowel into the shoulder at the side of the forms to mark the place so that later, when the concrete had set slightly, the finishers could easily locate the strips to remove them.

The concrete was then screeded by a Koehring Longitudinal Finisher that floated some of the surplus material over the sides of the forms. Two finishers with long-handled 10-foot straight-edges, working from opposite sides of the pavement, checked the surface of the fresh concrete. Other adjustments were made by these workers using wooden floats made of a 5-foot length of 1 x 6 at the end of 16-foot handles.

Then a 4-wheel bridge was hand-propelled over the forms. To this was attached a canvas belt 2 feet wide and 2 feet longer than the width of the slab. This removed any laitance from the surface of the concrete. The finishers then roughened the surface slightly with fiber brooms, 18 inches long, also on 16-foot handles. Working from another 4-wheel bridge, the finishers then pulled the steel strips at the contraction joints. They also edged along the joints with a $\frac{1}{4}$ -inch-radius edging tool, and

along the sides of the forms with a $\frac{3}{4}$ -inch-radius tool.

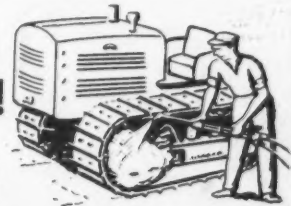
Safety Stripe

A 2-foot-wide black center-line stripe was then floated into the concrete from another 4-wheel bridge. The bridge had a rectangular template, $5\frac{1}{2}$ feet long x 2 feet wide, into which a finisher placed $1\frac{1}{8}$ pints of iron oxide powder. After spreading it out over that section of center line, he floated it into the concrete. The coloring material penetrated about $\frac{1}{8}$ inch into the concrete and left a permanent black stripe. The template prevented it from spreading beyond the 2-foot border.

Curing of the concrete was effected with Richkure membrane compound. This was applied from a 4-wheel bridge through a spray machine working on a W. G. Chausse pump and a Briggs & Stratton gas engine. Two men pushed the machine back and forth across the bridge, and at each advance 6 feet of concrete was sprayed. A hood over the

(Concluded on next page)

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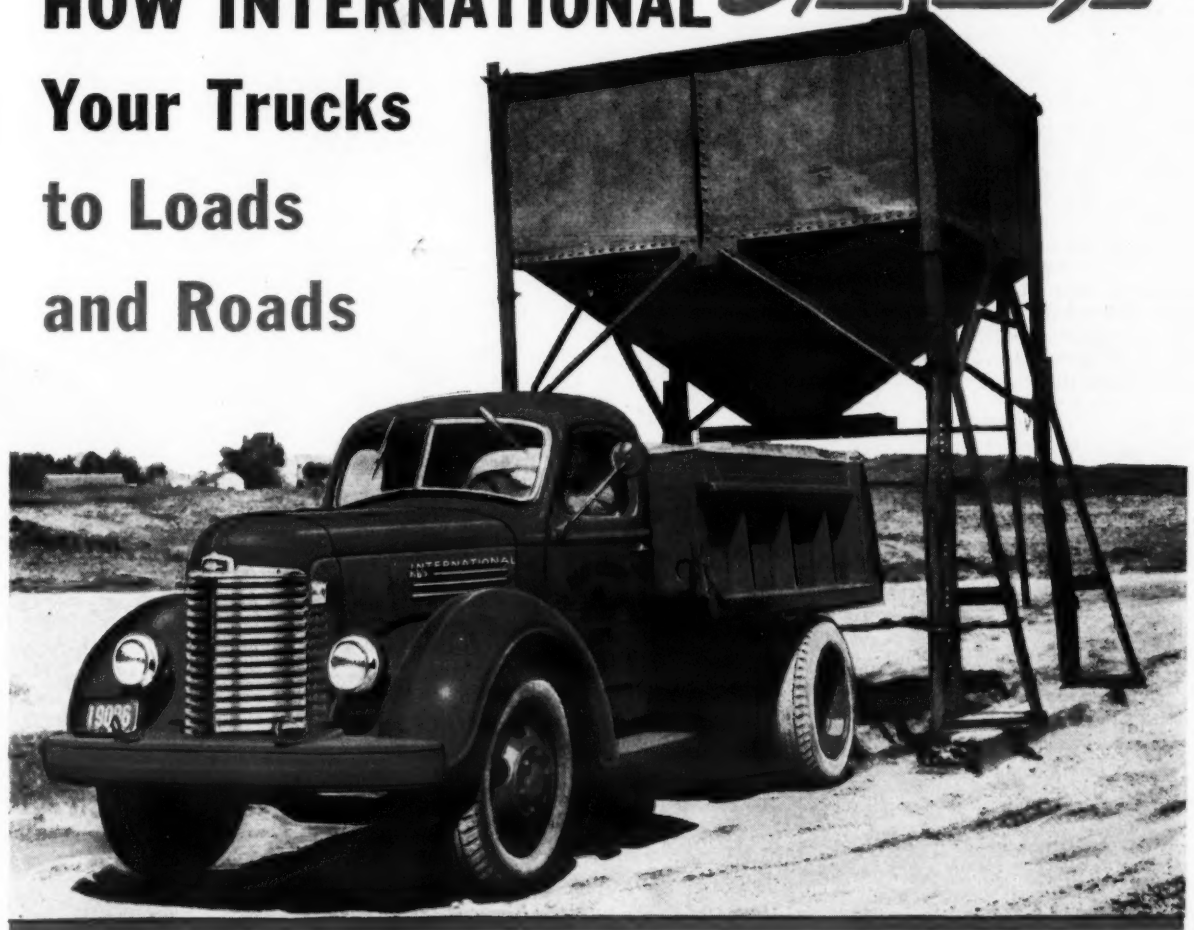
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INTERNATIONAL Trucks



C. & E. M. Photo

At McCalman Co.'s batch plant, a batch truck is loaded at the bin containing fine gravel and sand. A Loris crane with a 45-foot boom and a Williams 1-yard clamshell bucket services the bin.

Wide Shoulder Helps Paver on Road Job

(Continued from preceding page)

bar prevented the compound from being blown about.

Later, after the concrete had cured for some time, the 1-inch-deep contraction joints were cleaned out with compressed air. The contractor then placed $\frac{3}{4}$ x $1\frac{1}{2}$ -inch pre-molded asphaltic ribbon in the joints, tamping it down to the bottom of the slot but leaving an opening at the top about an inch deep. (The contractor had the privilege of placing either the ribbon in the contraction joints or poured joint filler known in Indiana as OAF-1.) Afterwards, the slots were filled with Careylastic rubber sealing compound. This joint filler was first heated in a White oil-bath heater to an even temperature of around 400 degrees F and then poured into the joints with a hand spout can.

In a 9-hour day from 800 to 1,000 feet of 24-foot-wide concrete was the usual production.

The Mix

The weights of a typical 8-bag batch of concrete were as follows:

Cement	752 lbs.
Sand	1,573 lbs.
Fine gravel, No. 5	1,647 lbs.
Coarse gravel, No. 2	1,098 lbs.
Water	44 gals. (maximum)

The gradation of the sand and the two different kinds of gravel were as follows:

Sieve Size	Per Cent Retained		
	No. 2 Gravel	No. 5 Gravel	Sand
2 1/4-inch	0	....	....
2-inch	0-5	....	....
1 1/2-inch	....	0	....
1-inch	80-100	2-15	....
3/4-inch	95-100	15-40	....
3/8-inch	98-100	40-70	0
No. 4	....	90-100	0-5
No. 8	....	96-100	5-20
No. 30	....	....	50-80
No. 50	....	....	80-90
No. 100	....	....	95-100

The Pure Oil Co. supplied the job with fuel, both gasoline and diesel.

Quantities and Personnel

The major items in the contract included the following:

Excavation	130,568 cu. yds.
Concrete for structures	1,075 cu. yds.
Reinforcing steel for structures	99,979 lbs.
Concrete pipe, 6 to 24-inch	6,000 lin. ft.
Underdrain tile, 6 to 15-inch	1,000 lin. ft.
Reinforced-concrete pavement	75,677 sq. yds.
Reinforcing steel	6,796 lbs.
Special subgrade treatment	18,000 cu. yds.

The McCalman Construction Co. employed a force of between 65 and 70 men under the direction of Haldane Earles, Superintendent. William Thompson was Paving Foreman.

For the State Highway Commission of Indiana, M. L. Hayes was Project Engineer. Carl E. Vogelgesang is Chief Engineer of the Commission, and James T. Hallett is Engineer of Roads.

Gen. Sales Mgr. for Simplex

Foster W. Lamb is the new General Sales Manager for Templeton, Kenly & Co., manufacturer of the Simplex line of jacks. He succeeds E. T. Scott who resigned because of illness.

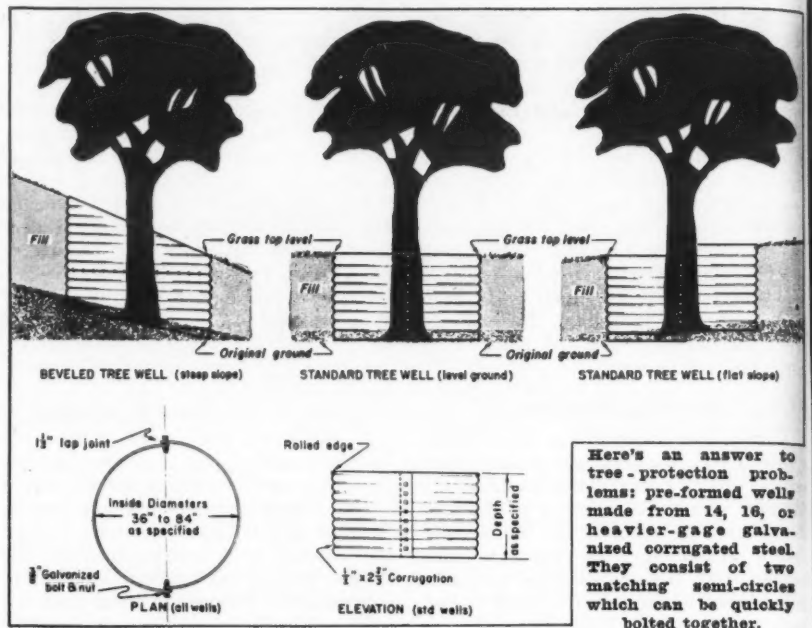
All-Metal Tree Wells

All-metal preformed tree wells for protecting trees during construction or for use in roadside-development operations are available from United Steel Fabricators, Inc., Wooster, Ohio. These wells consist of two matching semi-circles made from 16, 14, or heavier-gage galvanized corrugated steel, and are quickly bolted together.

The tree wells are fabricated to a 24-inch height as standard, but are produced to any height on specification. A rolled top edge is said to give extra rigidity and permit fills to within an inch of the well height. Well diameters range from 36 to 84 inches. A special beveled tree well is also produced for hillside fills. Bituminous coatings can be provided for use in excessively corrosive soils.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

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Assembly without special tools. Detachable end fittings can be reused over 100 times. No adjustment or tightening after assembly.

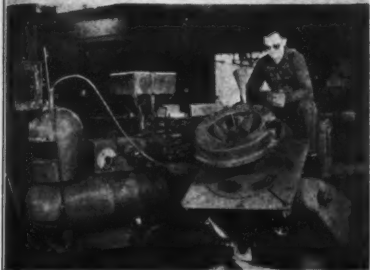
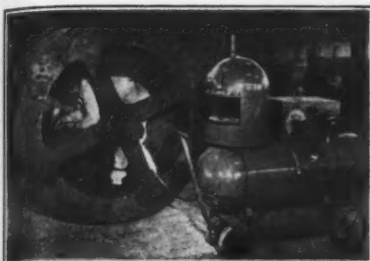
Hose construction: Tube and cover are made of synthetic rubber, oil and grease resistant, reinforced with two high tensile steel wire braids.

Available in the following sizes: $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 inch. These fittings are also available to service all types of greasing equipment.

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The Manual Lincolnweld equipment for hidden-arc welding, shown above, is applicable where the weld is inaccessible for automatic welding, or where the size and contour of the weld makes automatic welding impractical.

Hidden-Arc Welding Equipment Developed

New equipment for manual welding with the hidden-arc deep-flux process has been developed by The Lincoln Electric Co., P. O. Box 5758, Cleveland, Ohio. The Manual Lincolnweld is said to provide a flexible and maneuverable means of producing and using the high-current densities required for the type of weld which is usually associated with fully automatic operations.

The Manual Lincolnweld is designed to provide all the necessary welding current and auxiliary power needed. The basic element of the unit is a standard 600-amp welder which can be used for regular manual welding as well as manual hidden-arc welding. Mounted on the welder is a compact unit containing the wire reel, feed mechanism, drive motor, and voltage controls. A special cable, to which the cone-shaped welding gun is attached, completes the equipment.

The gun holds 3½ pounds of flux. This flux is dispensed by gravity through a special nozzle in sufficient amounts to cover the arc as the weld is made, the manufacturer states. The nozzle is insulated from the rest of the gun, and serves to introduce the welding current to the wire and to straighten the wire as it is fed through.

The Manual Lincolnweld uses a 5/64-inch-diameter electrode wire, which is fed automatically to the work. Automatic controls are designed to maintain a constant arc voltage. The amount of flux deposited over the arc is determined by the height of the gun above the work. Wire is fed through the nozzle at speeds of around 300 inches per minute. According to the manufacturer, welds made with the high-current densities used in this process result in deeper penetration and smaller cross section of the weld.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 88.

Blades for Many Purposes

Literature on its complete line of blades has been prepared by the Shunk Mfg. Co. of Bucyrus, Ohio. Individual bulletins describe the Shunk general line of blades, the offset scraper blades, hard-facing for blades, the Shunk scarifier blades, snow-plow blades, saw-tooth blades, saw-tooth scarifying blades, and others.

A special bulletin about the Shunk method of manufacturing is also available from the company. It shows the hydraulic presses used to form the blades to proper shape, the toggle presses for forming blades with special curvatures, the gas and oil furnaces for temperature control, the

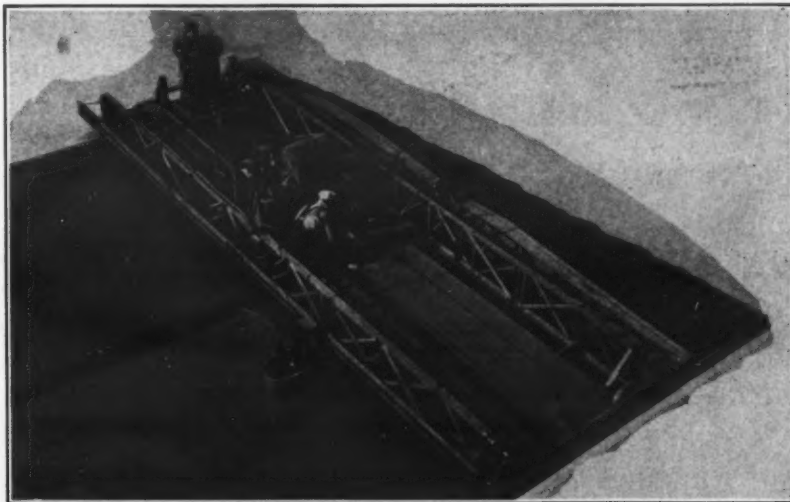
power hammers for forging operations, and the grinding and polishing units. It also shows several views taken in the Shunk factory, and it lists the major items in the Shunk line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 70.

New Unit Mechanizes Hand-Finishing Jobs

A combination machine that can be used to accomplish several paving operations at once is announced by the Flex-Plane Co., of Warren, Ohio. According to the manufacturer, it can perform automatic spray curing, brooming, belting, burlap dragging, and installing permanent traffic lines, and can do any three of these at one time.

The Flex-Plane combination machine is available in standard widths of 10 to 12½ feet and 20 to 25 feet; and in special widths on request. It is said that the attachments for specific work are



Complete mechanization behind the finisher is possible with this new Flex-Plane unit which sprays curing compounds, brooms, belts, installs traffic lines, etc.

easily installed on the basic automatic spray machine. All attachments are interchangeable.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

Choose your Radiotelephone on the basis of



FACTS "NOT BRAGS"

Radiotelephone is too important an investment to be made on the basis of high-flown phrases and advertising slogans. It's easy to make claims that can't be proved and to so word statements that they seem to mean more than they do.

So, choose carefully. Make sure that claims are provable, that features mean something, and that specifications are understandable. The best test is to talk to people who have bought the equipment in question. Is it performing according to claims? How much does it cost to maintain? What kind of service does the manufacturer give? The manufacturer who has nothing to hide will welcome your skepticism.

Here are the **FACTS** about *Motorola* - compare them with all the others:

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Motorola manufactures and installs more radiotelephone equipment than any other — **BAR NONE**. Motorola has more fully qualified mobile-radio developmental engineers in their laboratories devoting time *exclusively* to mobile radio problems than any other manufacturer — **BAR NONE**. Motorola has the largest mobile radiotelephone research laboratory and offers more product development than any other — **BAR NONE**. Motorola has pioneered more FM mobile radiotelephone "firsts" than any other manufacturer — **BAR NONE**: **FIRST** with 20 D.B. quieting at 0.4 microvolt input. **FIRST** commercially successful FM 2-way radiotelephone with **FIRST** noise compensated squelch that makes present day radio communications practicable. **FIRST** to successfully build equipment for the 152-162 mc. band. **FIRST** to develop the vibrator power supply in receivers, now accepted as the best power supply system. **FIRST** with "Precision Selectivity" for channel conservation. **FIRST** with Precision Cavity for intermodulation control.

ADVANCED DESIGN

Only Motorola guarantees full channel utilization through "PRECISION SELECTIVITY." P.S. provides extraordinary channel protection from nearby central stations and other man-made interference. Motorola's advanced design is your guarantee against early obsolescence.

OVER-ALL COST

It's been proved — Motorola continues to operate when others fail. *Motorola takes less time out... costs you far less over the years than any other equipment regardless of initial price!*

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Hundreds of official records show Motorola equipment giving "like-new" service for over six years — with only limited routine maintenance required. Part for part, Motorola is the sturdiest equipment in the field today — and Motorola's rugged construction pays off for you.

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A Motorola Communications Engineer will be glad to call and discuss radiotelephone as it concerns your specific problems. He'll put you in touch with people in your business who are using Motorola equipment. He'll give you **FACTS**, not fiction, **FIGURES**, not fables —

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At far left: part of the Klockner-Humboldt-Deutz diesel-engine lab in Oberursel, Germany. Next photo: some of the lab equipment being unloaded from freight cars for the trip to Oklahoma A. & M. College. Above, the college's Dean Stapley (right) discusses plans for the new lab with E. C. Baker, Head, Department of Mechanical Engineering.

German Diesel-Engine Lab Comes to America

Oklahoma A. & M. College Awarded Diesel-Engine Research Equipment From Famous German Laboratory

Worldwide diesel-engine research has just changed its address from Oberursel, Germany, to the Oklahoma A. & M. College, at Stillwater, Okla.

With the announcement that the famous \$1,000,000 Klockner-Humboldt-Deutz research equipment has been assigned to A. & M. College on a long-time loan, research specialists turned their attention to Oklahoma, an area that Roger Babson includes in America's "magic circle".

Several collaborating agencies assigned the equipment to A. & M. after making a nationwide survey of 114 colleges and universities. The agencies included the U. S. Department of Commerce, the U. S. Office of Education, the Automotive Industry Advisory Committee, and U. S. Army and Navy officials.

Why A. & M. Was Chosen

Dr. H. C. Dickinson, retired physicist of the National Bureau of Standards, heading the Automotive Committee of eight, recommended A. & M. on the basis of the following advantages:

1. Preparedness to house the laboratory equipment in a building of its own.
2. Annual funds with which to carry on active research.
3. Immediate use of equipment.
4. The need to decentralize vital laboratory equipment and to locate it strategically at a distance from crowded and vulnerable coastal areas.

Among other considerations which prompted placement at A. & M. was the assurance of financial assistance from the oil industry of the southwest; the standing of A. & M.'s engineering school, particularly of its internal-combustion-engine laboratory; the school's Department of Mechanical Engineering and the work conducted by its specialists and the Engineering Experiment Station. The college made its bid for the equipment last summer under the auspices of Dr. Henry G. Bennett, College President, and Philip S. Donnell, Vice President and Dean of Engineering, 1929 to 1947.

From Germany to U. S.

The laboratory was found in Oberursel by an American investigating team headed by Otis D. Treiber, a consulting engineer for the Hercules Motor Co., Canton, Ohio. Reputedly the world's best-equipped laboratory, it was engaged in Germany in the development of two-cycle diesel engines for automobile and aircraft application, involving the loop-scavenging principle. Germans valued the equipment at around 10,000,000 Reichmarks. Re-

nowned Dr. Gunther Emelee was chief of six leading research specialists topping the list of the personnel when the laboratory operated in Naziland, be-

tween the Saar and Ruhr valleys and near the French border.

The equipment was packed and shipped to the U. S. about a year and a

half ago, and placed, on its arrival, in the Camden Quartermaster Warehouse, Alexandria, Va. From there it came
(Concluded on next page)

All roads lead to the

AGGREGATE PRODUCING EQUIPMENT...

The Pitmaster is our smallest portable gravel crushing and screening plant. 10" x 16" jaw crusher, 16" x 16" roll crusher and 30" x 9'6" double-deck horizontal vibrating screen assure a capacity of fifty tons of minus 1" material per hour.

The Junior Tandem is a gravel crushing and screening plant with a capacity of 70 to 100 tons per hour. It can be quickly converted to a rock plant by the addition of a Cedarapids portable primary.

VE-VJ Portable Crushing Plants are low-priced units designed primarily for the export market. They will produce up to four sizes of finished aggregate. Available with jaw or roll crusher and with or without a revolving screen.

In the 4024 roll crusher secondary, the roll crusher can be removed and replaced by a 4033 hammermill where road stone and agstone are desired.

BITUMINOUS MIXING EQUIPMENT...

Model "FA"s are our most portable batch-type bituminous mixing plants with capacities of 25 cu. ft. Every feature is built for easy portability, accuracy of mix and low cost. Air controls assure fast, easy operation and finger tip control. Ground level charging hopper for quick, easy loading. Pug mill discharges directly into trucks. Choice of gasoline, diesel or electric power, with or without a drier for hot or cold mixes.

The Cedarapids Compactor is an entirely new compaction machine for compacting highway sub-grades and bases, airport runways, dam fills and for stabilizing soil, graded aggregate or soil cement. It has been on test for three years and results show a very noticeable increase in density of soils at depths of three feet and more. Available in two sizes to fit variety of jobs.

OTHER SPECIAL EQUIPMENT...

Patchmasters are portable, continuous-mix bituminous mixing plants for producing 20 to 30 tons per hour. They are ideal for small jobs such as road maintenance work and out-of-the-way jobs, where portability and quick set-up are important.

intact to A. & M., in 70 units weighing a total of 131,100 pounds. It includes everything necessary to undertake diesel-engine research.

It is divided into three parts: a test cell unit including eight test cells for engines from one to eight cylinders; and research equipment for a materials-testing laboratory and a fuel-injection laboratory. It also includes many highly specialized machines—among them, an oscillograph and a Lindner jig borer with a microscopic adjustment, accurate to 1/400,000 inch.

Role in U. S.

At A. & M. the equipment will be used to operate a self-supporting laboratory coordinated with engineering services and working along with that institution's newly announced Engineering Institute of Technology. About 30 persons will be needed to operate the laboratory, and among those who will conduct research there will be top world specialists. A budget of some \$100,000 a year will be required. This



A 1948 FWD maintainer, Model HG, works over a road in Adams County, Colo. The new model features extra frame height and balanced load distribution.

is expected to be offset by industrial projects, since the laboratory will serve the oil industry and manufacturers of internal combustion engines, especially diesel groups.

Already a leader in research, A. & M. now becomes a major, worldwide center of diesel-engine laboratory investigation—a charge to fulfill whether there be storm or quiet on the western front.

Truck-Model Grader In New 1948 Model

A 1948 maintainer has been announced by the Four Wheel Drive Auto Co. of Clintonville, Wis. It is a standard model in the company's H Series, and is designated Model HG. It carries a gross rating of 20,000 pounds, has a chassis weight of 8,000 pounds, and a 154-inch wheelbase.

Frame height, with 9:00 x 20 tires, is 45½ inches with the truck empty. With the truck loaded to capacity, this is reduced to 40¾ inches. The extra frame height is made possible, the company explains, by high arched springs and overhead spring shackle mounting. The maintainer is designed to distribute loads on the front and rear axles so that the blade action will be regular.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Axle Shifting Unit Is Fully Automatic

Development and early announcement of an improved 2-speed axle shifting mechanism is confirmed by Eaton Mfg. Co., 739 E. 140th St., Cleveland, Ohio. The new device is fully automatic and electrically controlled. According to the manufacturer, shifting from low to high ratio and back again is possible at any speed and at any time without de-clutching or releasing the accelerator.

Eaton also discloses the development of a semi-automatic control. This one requires clutch and accelerator action, like the current vacuum-operated types, but it is operated electrically and is said to be more positive in action than existing controls.

Both types are being tooled for production, and delivery is expected to start in the fall. At first, these units are being made available for use with Eaton heavy-duty axles built for trucks with a capacity of 3 tons or more. The semi-automatic unit will probably be standard equipment with Eaton 2-speed axles, and the fully automatic will be available as an extra feature. Either control can be installed as a replacement for present types.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 45.

Construction Safety Movie

A movie on construction safety has been prepared by the Aetna Casualty & Surety Co. The company especially recommends it for showing to construction foremen and worker groups. It is entitled "Scaffolds, Ladders, and Floor Openings", and it outlines safety measures which should be observed to prevent accidents when working with this type of equipment.

The film forms a part of Aetna's campaign for greater public safety, and is available without charge to all interested groups who write to the company's Public Education Department at Hartford, Conn. The movie has been prepared on 16-mm full-color sound film, and has a running time of 9 minutes.

Sales Engineers for Carco

Three new Sales Engineers have been appointed by the Pacific Car & Foundry Co., Renton, Wash., manufacturer of the Carco line of tractor and construction equipment. James M. Miller, Jr., 2931 N. 11th St., N. Sacramento, Calif., will represent the firm in the southwestern United States. Robert J. Sinclair, 5141 Hazel Ave., Philadelphia, Pa., will handle the New England states. And Wayne Lindgren, P. O. Box 1082, Savannah, Ga., will cover the southeastern section of the United States.

Cedarapids Exhibit
AT THE ROAD SHOW

SPACE SC3205 - SC3012
Annual Convention and Road Show
American Road Builders' Ass'n
SOLDIER FIELD,
JULY 16-24
CHICAGO

**FOR BETTER ROADS
FOR A BETTER WORLD**

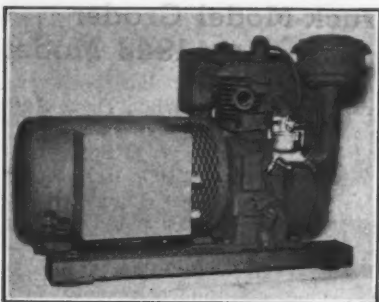
Buy Best

Buy Cedarapids

Built by IOWA

THE IOWA LINE of Material Handling Equipment Includes —
ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET
ELEVATORS • VIBRATOR AND REVOLVING SCREENS • FEEDERS • TRAPS • STRAIGHT
LINE ROCK AND GRAVEL PLANTS • PORTABLE POWER CONVEYORS • PORTABLE
STONE PLANTS • PORTABLE GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH
TYPE ASPHALT PLANTS • DRAG-SCRAPER TANKS • WASHING PLANTS • TRACTOR-
CRUSHER PLANTS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

IOWA MANUFACTURING CO., Cedar Rapids, Iowa, U.S.A.



The new Model 26 HAB4 1,000-watt 115-volt 60-cycle ac Katolight plant is powered by a Briggs & Stratton Model 14FB air-cooled engine.

New Lighting Plant Delivers 1,000 Watts

A new 1,000-watt lighting plant is announced by the Kato Engineering Co., Mankato, Minn. It is powered by a gasoline engine rated at 2.6 hp at 1,800 rpm. The governor is said to hold the frequency within less than one-cycle variation between partial load and full load. A built-in mechanically operated automatic choke is provided as standard equipment. The Katolight plant is available with remote control or for automatic control, and produces ac electricity.

Feature of the unit is this: the breaker points are mounted outside the crankcase, alongside the carburetor, to permit servicing without removing the flywheel. A spark advance on the camshaft is said to retard the spark automatically at starting speed and to advance it as the engine speed increases.

Among the other features claimed for this lighting plant are a Magnematic ignition system, Alnico permanent magnets, and a molded waterproof coil. It is available with a gravity carburetor with a 1-gallon fuel tank, or it can be furnished with a mechanically operated fuel pump.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Rod Cuts Without Oxygen

Applications of its surface and underwater cutting tool are illustrated in a catalog available from the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Known as Cut-Trode, it is designed for use with any ac or dc welding equipment. It employs

an electric-arc vapor for its cutting.

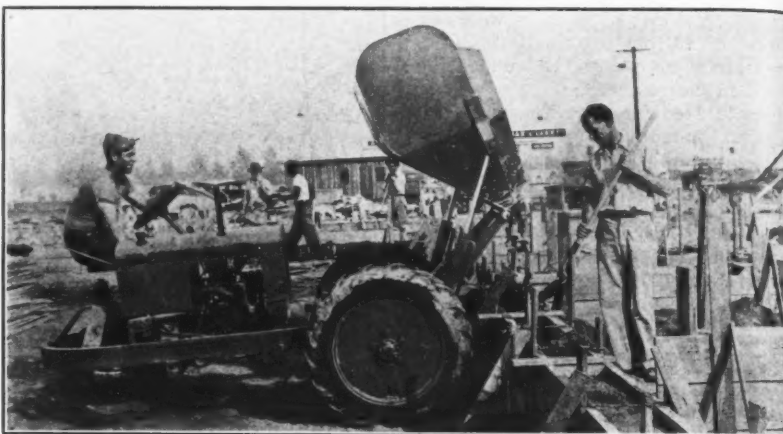
This 8-page bulletin contains complete information, technical diagrams, and instructions for using the tool. Illustrations show CutTrode piercing, cutting, gouging and chamfering on cast iron, stainless steel, aluminum, and other metals. The catalog also contains information on other Eutectic rods.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 73.

Powered Wheelbarrow

A powered wheelbarrow designed to speed material-handling operations at low cost is announced by the Construction Products Corp., 4345 E. Imperial Highway, Lynwood, Calif. Marketed under the trade name of Profit Mover, it is powered by a 4-cylinder gasoline engine and has a 4-speed transmission permitting travel speeds of up to 20 mph. It is particularly adaptable to concrete placing jobs.

The Profit Mover features full hy-



A high dumping angle, short turning radius, and narrow width feature the Profit Mover, a new gasoline-powered materials transport.

draulic dumping controls, high capacity, a short turning radius, narrow width, and high-dumping angle. Standard equipment includes hydraulic brakes, parking brakes, electric starter, and heavy-duty industrial clutch. A power

take-off is also available for use with auxiliary equipment. Dual wheels and oversize tires are available.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.



America's Largest Builder of Material Handling Buckets

SHOVEL PULL SHOVEL DRAGLINE CLAMSHELL

FRONTS, BOTTOMS, SCOOPS and TEETH shown in color on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

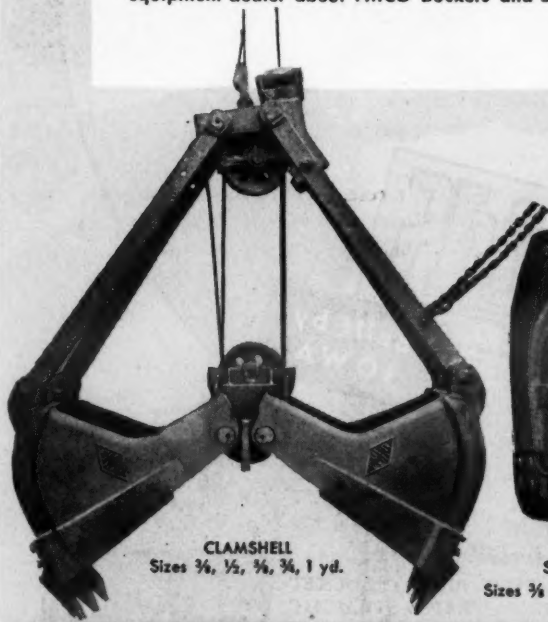
Experience Counts. See your shovel man or equipment dealer about PMCO Buckets and Dippers.



DRAGLINE
Perforated Sizes 3/4 yd. to 2 yds. 20%-40% lighter than other makes.
Solid Sizes 3/4 yd. to 2 yds.
Mine Stripping Sizes 2 yds. to 9 yds.



PULL SHOVEL
Outside Cutter Widths:
21", 26", 31", 36", 39"

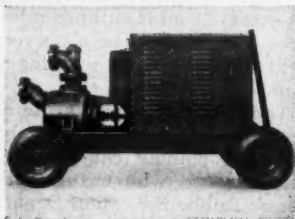


CLAMSHELL
Sizes 3/4, 1 1/2, 2 1/2, 3 1/2, 5 yd.



SHOVEL
Sizes 3/4 yd. to 18 yds.

On the 1/2 yd. and 3/4 yd. Shovel, Pull Shovel, and Dragline Buckets, all teeth are interchangeable—a great advantage to operators.



HUMDINGER SELF PRIMING CENTRIFUGAL PUMPS

You've never seen a self-priming centrifugal pump that will move so large a volume of water as efficiently and with as little maintenance as the new "HUMDINGER 8" Model 125 MCCH.

Combining all the features of large air capacity, simplicity and rugged construction with the exclusive CARTER ball type priming and co-axial volute, this unit is guaranteed to give you unfailingly satisfactory service.

For complete details, write for bulletin 4503.

RALPH B. CARTER CO.
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U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES

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Pennsylvania Starts Traffic-Count Survey

A traffic-count survey has been undertaken by the Pennsylvania Department of Highways. It will provide traffic-density counts on approximately 31,000 miles of state highways in the rural areas, and about 3,000 miles of state routes extending into urban areas. The survey will take about 2 years to complete, and will include all improved-surface highways in the state. The data will be obtained principally from 105 portable machines designed to record traffic volumes hourly. Continuous counts will be provided by 30 electric-eye recorders.

Four major control stations will be established in each of the twelve districts into which the Department has been divided for the survey. Four classes of highways have been established and one major control point will be set up on each of these. Class 1 includes roads with an average daily traffic count of 5,000 vehicles or more;

Class 2, those with volumes between 1,500 and 5,000; Class 3, those with volumes between 800 and 1,500; and Class 4, those with volumes of between 400 and 800 vehicles. Each station will be operated on a schedule of three weekdays, one Saturday, and one Sunday of each month.

Sixteen minor control stations will be established in each of the districts. These will be set geographically to cover roads in the four classes of traffic. Each of these stations will be operated on two weekdays, six times during the year. Each district will have about 1,000 coverage counts, to include all sections of roads not covered by major and minor control points and at all municipal boundary lines. These counts will be taken on one weekday during the year. Portable recorders will be used to gather the data at the major and minor control stations, and at the coverage-count stations.

Twenty-four-hour manual counts will be made at the electric-eye stations and on major control stations on roads

with an average traffic volume over 2,000 vehicles daily. The schedule for these counts is two weekdays, one Saturday, and one Sunday, six times during the year. Manual counts are planned at stated intervals at the locations of electric-eye recorders on the less heavily traveled roads.

Coverage points will also give information on traffic densities at principal intersections with other state highways and in urban areas.

Catalog Covers Blocks, Hooks, and Accessories

A 98-page stiff-bound catalog listing its complete line of specialty products has been prepared by The Skookum Co., Inc., 8504 N. Crawford St., Portland 3, Ore. This line includes blocks, sheaves, graphited bronze bearings, hooks, tongs, clevises, choker hooks, swivels, undercutters, marlin spikes, climbers' equipment, links and rings, manganese-steel Bardon hooks, splitting wedges, mauls, hammers, sledges,

and the Columbia ram pumping unit.

Each of these is discussed in detail, as are related specialty items. The catalog tells what each unit is designed for, its capacities, and the sizes in which it is produced. Photographs show the Skookum plant and scenes taken in the factory. Drawings illustrate some of the set-ups for the equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 52.

Local Engines Make Good



WAUKESHA ENGINES

• With the "home town folks" there's no distance to lend enchantment. They know what you make, and how you make it. If they use what you make, like what it does for them and how it does it... and say so... you've got something!

When Mr. E. J. Stephan and Mr. Grover Dobbartin tell you, "For many years Waukesha County has been purchasing road equipment powered with Waukesha Motors" and speak of Waukeshas' "fine performance" it is significant. They are the Highway Commissioner and the Chairman of the Highway Committee of Waukesha County.

They go on to say: "Most of our large maintenance trucks are equipped with your motors as well as a large power shovel and air compressor. These units have given us very satisfactory results."

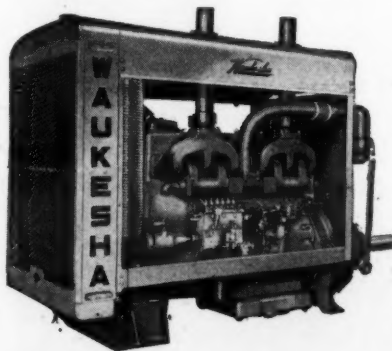
"Just recently we purchased one of your LARGE DIESEL POWER UNITS for our new crushing plant and it is proving out far beyond our expectations. One short day we crushed over 600 yds. of gravel, which is about double the production of the unit owned and operated by Waukesha County previous to

the installation of the Waukesha Motor Company Diesel... The service that you render when needed is superb."

The Diesel unit referred to is the Waukesha Super Duty Diesel. Mounted on its own trailer it is a general utility rig and may be used for any number of applications.

Consult Waukesha engineers on all your power problems. Send for Bulletin 1418.

**SUPER DUTY
DIESEL Model
6-WAKDU
POWER UNIT**
six cyl., 6 1/4 in.
bore x 6 1/2 in.
stroke, 1197
cu. in. displ.,
190 hp. max.
rating at 1300
rpm.



WAUKESHA MOTOR COMPANY, WAUKESHA, WIS., NEW YORK, TULSA, LOS ANGELES

10 Times as Fast
with
SYNTRON

DEPENDABLE

ELECTRIC HAMMERS



DRILLING

in concrete and masonry to hang shafting, anchor machinery, install lighting fixtures, etc.

CUTTING

concrete and masonry for riser holes, door and window openings, channeling for conduits, etc.

CHIPPING

old concrete, removing old mortar from between brick and stone for water-proofing.

BUSH HAMMERING

concrete surfaces.

VIBRATING

concrete forms.

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concrete, rust and old paint from equipment.

Electromagnetic design with only one working part—the reciprocating piston striking 3600 blows per minute.

Write for illustrated folder

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227 Lexington,

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MOVING? Be sure to give us 30 days' notice of your change of address—and let us have your old as well as your new address.

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CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Ave., New York 16, N.Y.

Dredge Clears Shoals From Harbor Bottom

A.G.&P.'s Baltimore Uses Submerged Line to Avoid Interfering With Harbor Traffic at Charleston

CHARLESTON, South Carolina, has one of the finest natural harbors on the Atlantic Coast. To keep it so, the Corps of Engineers, Department of the Army, is currently engaged in dredging projects to remove shoals and maintain a 35-foot depth of channel. At the entrance channel of Charleston Harbor, the U. S. hopper dredge Gerig is clearing the bottom to the necessary depth for the full project width of 1,000 feet. This wide channel extends from the Atlantic past the downtown wharves and docks of the city.

Beyond that, and up the Cooper River flowing along the east side of the Charleston peninsula, a 600-foot channel is maintained to the U. S. Navy Yard. Above the Navy Yard the channel width is 400 feet to the Port of Embarkation, 10 miles from the sea. A 700-foot width is provided at the turning basin in front of the docks at the port. At the bends the channel is widened considerably. Where two channels in the river, one on each side of Drum Island, come together just north of the Cooper River Bridge, the width of channel is from 1,000 to 1,200 feet. In this area the dredge Baltimore of the Atlantic, Gulf & Pacific Co. of New York City has recently finished a contract for the removal of two shoals involving approximately 1,000,000 cubic yards of material.

Recurring Shoals

Since these shoals are of the recurring type and must be dredged at least once and sometimes twice a year, they have been given the identifying numbers 5A and 6. Shoal 6 lies just north of Drum Island where the two channels encircling the island come together. It is about 5,400 feet long and shaped like the tail of a whale. It has a maximum width of 800 feet across one fluke, and 400 feet across the other, or a total of 1,200 feet at the widest part. At the upper or north end the shoal tapers out to a point.

Shoal 5A is about 4,000 feet north of No. 6, and is about 3,000 feet long with an average width of 600 feet. When the Atlantic, Gulf & Pacific Co. first approached the job, the yardage to be removed was approximately 837,000. But in a short time this figure was increased through rapid shoaling by 200,000 more cubic yards, bringing the total yardage to over 1,000,000. The estimated cost with this total dredging yardage was \$265,000. Work on the project started on February 25, 1948, and by working 24 hours a day for 7 days a week the contractor completed the dredging on April 10. The Baltimore averaged 23,000 cubic yards of excavation per day.

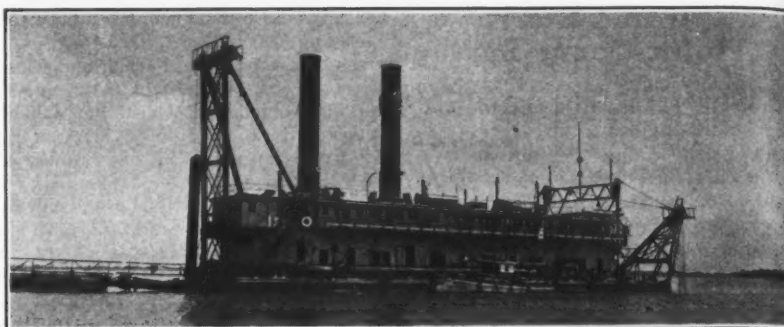
To keep accurate dredging records in this rapidly shoaling river, the U. S. Engineers took soundings with depth finders from their motor boats a few days before dredging started over any portion of the shoal. Within a few days after the dredge completed a stretch of the work, the area was again cross-sectioned in order to make certain that the contractor received full payment for what he had dredged.

While these shoals in the river have been generally prevalent, their recurrence in recent years has been more and more frequent. This substantial increase in silting and shoaling has been attributed by some sources to the Santee-Cooper hydroelectric project, 45 miles up the Cooper River, where a dam has been constructed at the lower end of the

Santee and Pinopolis Reservoirs. The dam forces more silt-bearing water down the river, thereby causing the accumulation of mud and silt on the Charleston Harbor bottom, it is said.

Pros and Cons

Shoals 5A and 6 were dredged in that order. About 25,000 cubic yards of material was pumped into a spoil area along the eastern shore line of the Charleston peninsula north of the city. This was a low-lying marsh area that could well accommodate the fill. The remaining and greater portion of the excavation, totaling nearly 1,000,000 yards, was pumped from 5A to the north end and from 6 to the south end of Daniel Island lying between the Cooper and Wando Rivers. This spoil



C. & E. M. Photo

Here is the cutter-head suction dredge Baltimore which recently removed two shoals in Charleston Harbor, involving about 1,000,000 cubic yards of material. Her two-deck superstructure has just had a fresh coat of gray paint.

area is east of the shoals, so the dredge worked downstream in successive passes. With this procedure additional lengths of floating pipe were always added to the pontoon line as the dredge advanced. Only in a few instances did the dredge work upstream, and then the floating line was shortened by removing some pontoon sections.

As far as the material was concerned, dredging the shoals was easy. The nature of the excavation was either a soft mud or silt that was readily swallowed up by the cutter-head suction dredge. Occasionally a piece of an old boiler, a pile butt, a chunk of bed spring, or an automobile tire that had found

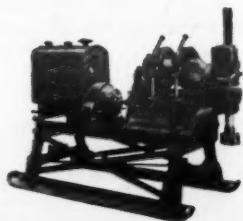
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CP money-makers FOR THE CONTRACTOR

BOOTHS 2601-2462
North Concourse (near Gate 28)
A. R. B. A. ROAD SHOW
Soldier Field, Chicago
July 16-24



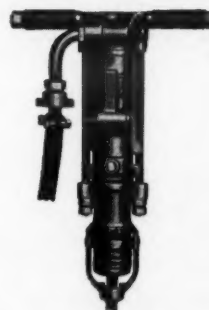
FOR SPEEDY OPERATION—Designed for fast drilling with the more powerful drifter drills, the G-200R lightweight CP Wagon Drill will drill holes at any angle. The sliding cone, with a 36-inch adjustment, offsets ground irregularities of even steel lengths. Its three roller-bearing wheels, equipped with pneumatic tires insure ease of movement however rough the ground. The G-200R Wagon Drill is available with CP-50N (3"), CP-60N (3½"), or CP-70 (4") Drifters.



UNEXCELLED FOR TEST BORINGS

Specifically designed for drilling and standpiping jobs where the "going is tough," the rugged CP No. 8 gasoline-driven Diamond Core Drill has a capacity of 900 feet with E-EX Fittings.

Within its rated capacity, it meets every requirement for test borings and for mineral prospecting from the surface. Skid-mounted, readily moved from hole to hole under its own power.



CP SINKER DRILLS For Every Type of Job

Outstanding for high drilling speed, strong rotation and effective hole-cleaning qualities, and for low air consumption, CP Sinker Drills range from the 28 lb. CP-22 to the 119 lb. heavy-duty CP-60N.



FOR GENERAL DEMOLITION

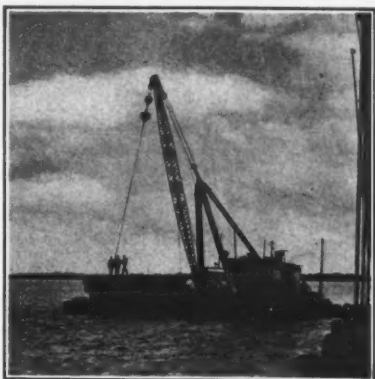
The CP-115 (60 lb. class) Demolition Tool is a general utility adaptable to a wide range of demolition work; from the light CP-111 (25 lb. class) to the heavy CP-117 (80 lb. class).

its way to the bottom of the river was also drawn up into the intake line. Then the cover of the manhole in the intake line in front of the pump was lifted off and the foreign object removed before it reached the pump. Aside from such happenings, the dredge pumped an average of from 10 to 12 per cent solids.

To get the required project depth of channel, 35 feet below mean low water, the contractor elected to go down to 36 feet to be sure of meeting the specifications. The maximum depth of bank dredged on this job was 7 feet, with the average only about 4 feet. In such shallow cuts the Baltimore advanced as much as 1,100 feet a day as it dredged a 200-foot-wide strip lengthwise of the shoal. But as it moved ahead on an average of 6-foot steps in making its cut, naturally no impressive figures in excavation yardage could result in such shallow digging and frequent forward moves of the dredge.

Submerged Line

Dredging operations, of course, could



C. & E. M. Photo
Preparatory to moving the dredge Baltimore ahead, the No. 5 derrick boat raises a swing anchor using its 70-foot boom and Mundy winch which is powered by a Hercules gas engine.

not be permitted to interfere with harbor traffic up and down the Cooper River. Consequently the 27-inch discharge line was submerged across the channel. It connected on the shore side

with shore pipe, and with the dredge through the same size of pipe mounted on steel pontoons. The length of the pontoon line varied with the progress of the dredge as sections of pipe line were added or removed as necessary. The required connections were made somewhere along the stretch of floating pipe. The submerged pipe line remained where it was first sunk in place beneath the harbor channel, but different connections with the floating line were made to it on four occasions as work progressed across the shoal.

The submerged line lies on the bottom of the river under from 6 to 35 feet of water. Before it was sunk in place a survey was taken in order to get a profile of the river bottom at the location where the pipe was to be laid. Then the spotting of the ball joints at every pronounced change of grade on the bottom was determined. The straight sections of the 27-inch discharge line, both floating and submerged, have bolted flange connecting joints at the ends of the 40-foot lengths of pipe. Every third



C. & E. M. Photo
Chief Engineer John Rankin inspects one of the two big Foster Wheeler boilers on the dredge Baltimore.

joint on the floating line is a ball joint with a maximum turning capacity of 17 degrees.

Before the submerged line was laid, a 1,760-foot stretch or 44 lengths of pipe was first assembled in shallow water. Two steel storage barges, one 90 x 30 x 9 feet and the other 60 x 30 x 6 feet, carried the lengths of pipe, joints, etc., used in making the line. They later held such other equipment as extra cutter heads, runners and liners for the pumps, etc. The submerged line was made up, length by length, on the deck of derrick boat No. 5. This is a steel 60 x 30 x 6-foot barge with a 70-foot boom of 12-ton capacity and a Mundy winch for a hoist which is powered by a Hercules gas engine. As the pipe lengths were joined together, they were slid off the barge into the shallow water.

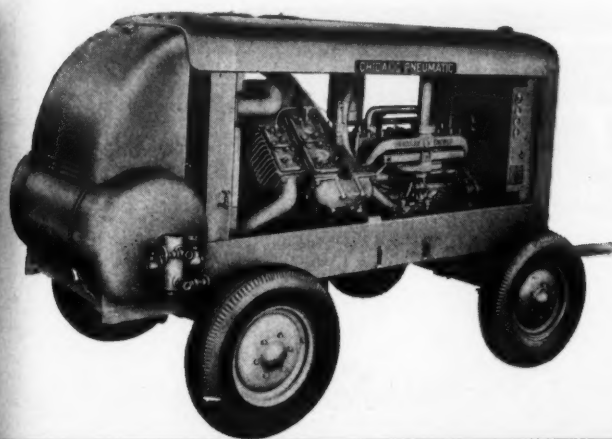
To keep the line from sinking, 1/2-inch steel plates or blanks were inserted in the ball joints at the ends of the line as water stops. Two openings were made in these blanks—a 1 1/2-inch hole for an air line, and an 8-inch-diameter hole for the passage of water. While the line was being prepared, the water hole was closed and air was pumped into the pipes through a 1 1/2-inch hose. Compressed air was supplied at from 40 to 60-pound pressure by an Ingersoll-Rand 315-cfm compressor carried on the deck of the water barge.

Strong Tides and Currents

At slack water, so that the strong tides and currents interfered as little as possible with the maneuvers, the line was floated into position over the picked location on the harbor bottom. This careful center of the pipe was done by the two tugs on the job, both driven by Fairbanks-Morse diesel engines. The Gilbert is a 54 x 14 x 9-foot craft with a 240-hp engine, and the Julie measures 44 x 12 x 7 feet with a 120-hp engine. Delicate handling of the line was essential to hold it in place free from loops, curves, or bulges in the alignment. Then the pipe was sunk gradually by releasing air from the line and admitting the water. A valve on the 1 1/2-inch air hose permitted this sinking to be controlled with an exact nicety, so the pipe could be dropped precisely into the intended location. The submerged line was extended until it reached the shore of Daniel Island.

The ball joints in the submerged line were marked with buoys. These consisted of a length of 1 1/8-inch wire cable with a drum floating at the end of it. After the submerged line reached the shore, the 27-inch discharge pipe consisted of 16-foot lengths with tapered male and female joints. The land line was about 2,000 feet long, and the rather infrequent shifting of this portion of the discharge pipe was done by hand with a small land crew totaling 16 for the three 8-hour shifts. Actually,

(Continued on next page)



ECONOMICAL OPERATION AT ANY SPEED

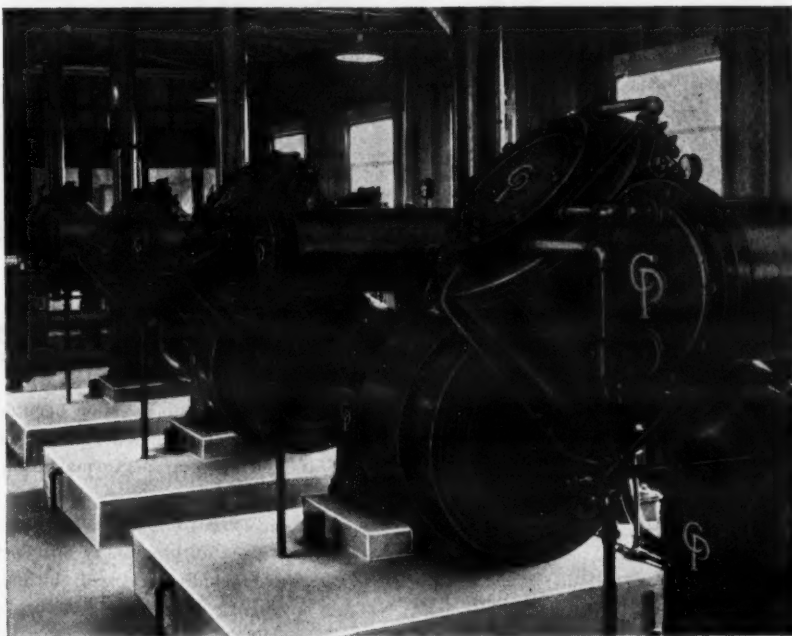
The contractor always can count on economical operation of a CP Portable Air Compressor, because the CP gradual speed regulator adapts engine speed to air demands, holding fuel consumption to a minimum. This and other CP features effect fuel savings of 15% to 35%.

CP Portable Compressors are available in gasoline-driven models of 60, 105, 160, 210 and 315 c.f.m., actual capacity, and in Diesel-driven models of 105, 160, 210, 315 and 500 c.f.m.

IT'S EASY TO INSTALL

Shipped intact as a "package unit," ready for external connections, a CP Type Y Compressor can be set up quickly with minimum expense. It needs only a simple foundation and requires no special skill to install. Its compact design makes it ideal where floor space is restricted.

CP Type Y Compressors are available with built-in or direct-coupled motor, or with V-belt drive, in capacities of 500 to 900 c.f.m., at 90 to 125 pounds pressure. Sizes for other pressures also furnished.



CP UTILITY WINCH

Powered with gasoline, electric or air motors, CP Utility Winches have a wide range of applications—single or multiple line hoisting, spotting cars, handling timber and structural steel, etc. Precision control is provided through clutch and brake levers.



**CHICAGO PNEUMATIC
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



C. & E. M. Photo
This is the big suction pump for the dredge Baltimore. It is of A. G. & P. design, and has a 34-inch intake, a 27-inch discharge, and an 84-inch impeller with 4 vanes.

Dredge Clears Shoals From Harbor Bottom

(Continued from preceding page)

four separate crews were used both in the land operations and on the dredge, though only three shifts were worked. In this way every man in the contractor's force got one day off a week.

It required strong ties to keep the floating line in position. The difference in tide levels in Charleston Harbor is 5.2 feet, while currents in the ebb tide are as great as 5 miles per hour. This heavy pull, often accompanied by powerful winds, was offset by a string of anchors numbering as many as 10 to 15 on each side of the floating pipe. The anchors weighed from 1,200 to 3,000 pounds, and were controlled at the pipe by hand winches. Slack was taken up or more line paid out according to the movements of the tide. The pontoon where the floating line enters the water was held in position by a pair of 3,000-pound anchors; so was the pontoon at an elbow point in the line.

Pontoon Arrangement

Each 40-foot length of 27-inch floating steel pipe was supported on a pontoon system consisting of two cylinders placed at right angles to the pipe and 32 feet apart. The cylinders were 52 inches in diameter and pig-nosed shaped, being 32 feet long on top and 26 feet on the bottom. Timber strongbacks and U-bolts held the pipe on the pontoons. A 20-inch-wide wooden catwalk with a wooden hand rail on one side was constructed the length of the floating line from the dredge out to the pontoon where the pipe entered the water. This walk was used by the men who handled the anchor winches, and the crew which added or removed sections of pipe line.

Hand signals were used by the shore crew to communicate with the dredge. Waving a flag in a circle meant go ahead

with the dredging; a horizontal movement signified to shut down; a vertical waving of the signal meant that water only should be pumped through the line. At night a lantern was substituted.

Although the Baltimore can dredge a cut 300 feet wide, it made a swing of only 200 feet on this job because of the strong currents. The work was done at a time when the early spring tides were fullest; also during and after a winter marked by excessive rainfall which increased the rate of flow down the Cooper River. With the reservoirs upstream filling rapidly, more water than usual was released at the dam. In making the 200-foot cut the dredge swung on anchors which were placed 400 feet out from the center line of the cut being worked. The Baltimore advanced 150 feet at a time before the derrick boat, maneuvered by a tug, picked up the anchors and moved them ahead down the shoal.

The Baltimore and Safety

The Baltimore and its crew are old



C. & E. M. Photo
Personnel on the Charleston Harbor dredging job included, left to right, Captain John Carlson of the Baltimore; Henry F. Rivers, Chief, Operations Division, Corps of Engineers; Joseph G. Hollowell, Safety Engineer, Charleston District, Corps of Engineers; and George H. Warner, Superintendent for the Atlantic, Gulf & Pacific Co.

friends of CONTRACTORS AND ENGINEERS MONTHLY. A previous visit to this Atlantic, Gulf & Pacific Co. dredge was

described in the December, 1946, issue beginning on page 6. At that time the (Continued on next page)



Compare the Cost—As Well As the Quality of Work

Machines, like men, must be judged by what they do. Moto-Pavers have now been on the job for well over a year. We are glad to have them judged by their performance on the road.

From coast to coast and from the lakes to the gulf, Moto-Pavers have been used on practically all types of road construction and maintenance work, including retread, bituminous resurfacing over gravel and old pavement, bituminous stabilization and oil mix on city streets, county roads and state highways.

Aggregates used included beach sand, gravel, crushed stone and slag. Bituminous materials included RT-2, 3, 7 and 8; RC-2, 3 and 4; MC-3 and 4; SC-3, 4 and 6, and various emulsions.

Construction costs varied widely, due to material, weather, traffic and other road conditions. However, typical cost tables reveal amazingly low costs per ton. These cost and performance figures have been summarized in a brief performance record and report which will be sent you on request. For convenience, use the coupon below.

SEND FOR THIS PERFORMANCE RECORD AND REPORT

HETHERINGTON & BERNER INC.
731 Kentucky Ave., Indianapolis 7, Ind.
Please send copy of Moto-Paver Performance Record and Report to:

FIRM:

BY:

ADDRESS:

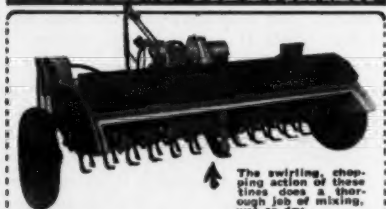
CITY

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FOR SECONDARY ROAD CONSTRUCTION... ARIENS AGGMIXER



The swift, chopping action of these tines does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Whatever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with blades—rapidly and economically. Also ideal for soil cement stabilization. Safe made 4 standard sizes, 4', 5', 6' and 7'. Write for details.

ARIENS COMPANY BRILLIANT WISCONSIN

Baltimore was working in Fire Island inlet on the south shore of Long Island, N. Y., pumping coarse white sand out of the channel and restoring an eroded section of beach with hydraulic fill from the discharge. Little change was apparent in the big dredge that was built in Baltimore, Md., in 1935 by the Elliott Machine Corp. The deck of the welded steel hull, 200 x 44 x 12 feet, was as clean and free from dirt or grease as ever, while the two-deck superstructure looked neat in a fresh coat of gray paint.

This contractor has cooperated with the Army Engineers to the fullest extent in all measures to increase the safety of the men. Bright yellow paint covers anything a man might stumble over on the deck of the dredge. As a result, he can't help seeing the capstans, hatch covers, companionway steps, etc., just above deck level. Yellow rings also encircle stanchions at eye level as additional attention-getters.

A steel chain, about thigh high, supported on uprights runs around the outside of the deck. If this doesn't prevent a man from going overboard his life jacket will at least keep him from drowning. For the A. G. & P. Co. provides its men with Tapatco life jackets designed to keep a man's head out of the water even if he has been knocked into limp unconsciousness, and yet made without that bulk which hinders a man's movements while he works. The crew members must wear these jackets when they are working on the decks, the catwalks, in small boats, or on other floating rigs or barges.

One other safety feature, inconspicuous but highly important to life and limb, was a "dog" or metal channel in use in the dredge operator's deck house in the bow overlooking the ladder. When the ladder was raised, the "dog" was slipped over the lever to lock it in that position. Then if any work was being done on the ladder, such as oiling a sheave, the dredge operator could not move the ladder unless he first removed the locking device. This catch prevents the ladder from being moved inadvertently by the lever man, or by an operator who has just come on in the new shift, or by accident. Mishaps have occurred on dredges when operators dropped the ladder, forgetting, or unaware that a man was working on it.

Slight Changes

Since our previous description of the Baltimore, some slight changes have been made to cope with the varying nature of the work on which it has been engaged. On this soft-silt dredging in Charleston Harbor, mud-digging blades had been put on the 6-foot-long x 6-foot-diameter cutter head. The manganese-steel 6-blade cutter head is at the end of the 70-foot ladder weighing 125 tons. The ladder is constructed of welded H-beams.

Because of the soft bottom, the length of the two spuds which are located outside the hull at the stern was increased from 61 to 68 feet by welding on additional lengths of 1-inch steel plate. The spuds are hollow steel cylinders made of 1½-inch tubing; they have a 34-inch

diameter and weigh 20 tons each. Most of the digging by the Baltimore was done with the starboard spud down.

The only other noticeable additions to the dredge were some racoons, pets of the crew, which were kept in a cage and pen on the top deck. The total complement of the Baltimore, including the

shore crew, was 100 men. Most of these were housed right on the dredge, but some had accommodations in Charleston, or lived in trailers ashore, going back and forth to work in a crew boat.

Power Plant

The Baltimore is powered by two

Foster Wheeler boilers located well aft in the hold. Each boiler furnishes 30,000 pounds of steam per hour and carries 310 pounds of pressure. They are equipped with Jerguson safety gages. Each boiler is heated by five Todd express-type oil burners, controlled by

(Concluded on next page)

Just the Job FOR A HEAVY DUTY GMC



and here's what
we mean by
Heavy Duty

Over-the-road or off-the-highway hauls of big loads of stone, sand, gravel and other construction materials are jobs for heavy, rugged trucks. They are jobs that GMC heavy duty trucks perform with outstanding efficiency, economy and trouble-free service.

For GMC heavy duties are built to stand the gaff of day-after-day heavy hauling work . . . with heavyweight big-truck axles, frames, transmissions, clutches, brakes, and gasoline and Diesel engines especially designed for hauling gross weights up to 90,000 pounds.

You'll save money on your heavy hauling by putting your money into a heavy duty GMC. Many models are now available for quick delivery. See your GMC dealer.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

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GASOLINE
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Vapor Blast Abrasive Cleaning

FOR BETTER CLEANING, DESCALING, DEGREASING!

Using SAND for abrasive cleaning—WATER to eliminate Dust—CHEMICAL (Metrolux) to prevent RUST, it offers THREE-WAY efficiency that quickly removes dirt, scale, welding flux, oxide, spatter-off compound, and other residues from metal parts of all kinds. Provides a smooth, velvety, rust-resisting surface—ready for any type of finish.

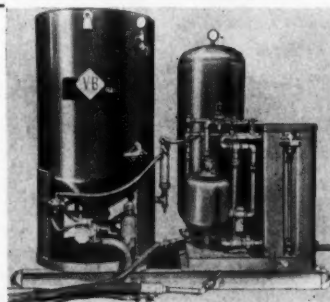
VAPOR BLAST abrasive cleaning is already doing a production speed-up job in aircraft, machine tool and structural steel plants, shipyards and foundries.

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VAPOR BLAST MANUFACTURING COMPANY

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VAPOR BLAST B-10 unit for abrasive cleaning. Portable.

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"Trading Post"

See pages 118 and 119

Send your ad to:

**Contractors &
Engineers Monthly**
470 Fourth Ave., New York 16, N.Y.

Dredge Clears Shoals From Harbor Bottom

(Continued from preceding page)

Weeks Merit automatic oil control. Both boilers consume daily 250 barrels of bunker C fuel oil. The dredge has storage tanks that hold 1,200 barrels of oil and 40,000 gallons of water.

Bunker C oil was supplied from an Esso station in Charleston, only ½ mile from the site of the dredging. A tug towed a steel 100 x 30 x 9-foot oil barge of 3,000-barrel capacity out to the dredge whenever necessary. Water for the dredge also came from Charleston, and was handled by a 60 x 30 x 6-foot steel water barge holding 30,000 gallons.

The boilers furnish steam to drive two Elliott turbines which are separate units but use a common condenser. The main 3,300-hp steam turbine has a direct drive to the big suction pump of the dredge through an 11 to 1 reduction gear. The pump is of A. G. & P. design with a 34-inch intake, a 27-inch discharge, and an 84-inch impeller with 4 vanes. The other steam unit, a 500-hp generator turbine, drives four Elliott generators, three on the main shaft and one in the hold. Of those on the main shaft a 320-kw generator furnishes power for the 450-hp cutter-head motor located in the bow at the dredge end of the ladder. A 165-kw generator drives the 250-hp winding motor, forward and at the center of the deck house. The other generator on the main shaft, a 100-kw unit, supplies current for lighting the dredge. The 25-kw generator in the hold is an auxiliary also used for lighting. Both the cutter-head and winding motors are of Elliott make.

The five-drum A. G. & P. Co. hoist is placed forward in the deck house with the ladder drum directly behind the 250-hp winding motor. This motor has power enough to operate all five drums at once, but this action is never needed as the two swing drums out to the port and starboard sides would not be used at the same time with the spud drums which are located directly behind them. From a power take-off, the motor also operates winch heads on each side for use in hauling lines. The drums work off a single drive shaft by means of a Philadelphia reduction gear placed on the starboard side of the swing motor. The operations are controlled with an A. G. & P. standard V-type clutch.

When the dredge is pumping, the average vacuum on the line is 10 inches, while the average pressure is 100 pounds to the square inch. The 27-inch discharge line leaves the pump at right angles on the starboard side and ascends from the hold to the deck outside the housing. From there it runs to the stern of the dredge where it makes a sharp turn by means of an elbow connection and passes through the blacksmith shop. An elbow joint turns the line so that it leaves the dredge at the center of the stern. A connection is made to the floating pontoon line with a swivel elbow.

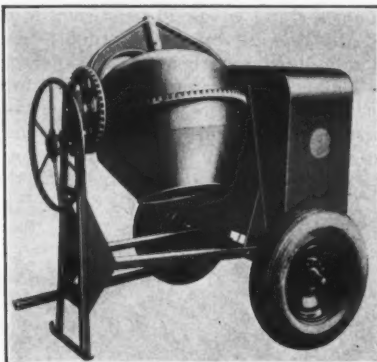
Personnel

George H. Warner was Superintendent for the Atlantic, Gulf & Pacific Co. on the Charleston Harbor dredging project, with Henry Benson as Assistant Superintendent. Captain John Carlson was Master, and John Rankin was Chief Engineer on the Baltimore.

For the Corps of Engineers, Department of the Army, Henry F. Rivers is Chief, Operations Division; Worth Candrick is Chief, Engineering Division; and Henry Dunbar was Inspector on the Baltimore. Joseph G. Hollowell is Safety Engineer for the Charleston District of the South Atlantic Division, which is headed by Col. Edward G. Daly, District Engineer.

New Half-Sack Mixer

A 3½-cubic-foot concrete mixer has been added to the line of Vanco Products, Inc., 130 S. Weber St., Colorado Springs, Colo. It is powered by a 3-hp air-cooled gasoline engine, and is mounted on a 2-wheel trailer-type



The Vanco 35-25VR concrete mixer is rated at 3½ cubic feet and has a 3-hp air-cooled gas engine.

chassis equipped with 6:00 x 16 pneumatic tires.

Among the features claimed for the Model No. 35-25VR mixer are a heavy semi-steel cast bowl and yoke, blades designed for fast but thorough mixing action, and a newly designed tilt gear for mixing and pouring from either side.

A heavily reinforced angle frame supports the engine and mixing chamber. It is provided with a retractable tow-tongue.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 79.

Midwest Branch for LE-HI

A direct factory branch has been opened in the midwest by the Hose Accessories Co. of Philadelphia. It is located at 1500 S. Western Ave., in Chicago, and is under the supervision of Wallace W. Neeb. It houses both office and warehouse facilities. Hose Accessories Co. manufactures the LE-HI line of hose couplings and accessories.

Warren Co. Appoints Candy

J. Bentley Candy has been appointed General Sales Manager, Lubrication Division, of the Warren Refining & Chemical Co., of Cleveland, Ohio.



Preparing for next Winter is a job for TODAY!

Order your WALTER SNOW FIGHTERS NOW!



EACH WINTER it happens... highway departments desperately in need of the Walter Snow Fighters they ordered too late for delivery by snow-time.

Each Spring and Summer we caution... order your Walter Snow Fighters NOW! This permits you to plan your purchases carefully—to set delivery dates—to avoid hasty, last-minute decisions and the necessity of taking "second-best" equipment in an emergency.

Our plant is busy producing Walter Snow Fighters and Tractor Trucks. Let us schedule your needs now. Your Walter distributor is ready to give you full data on the many superiorities of Walter Snow Fighters, and to book your orders. Meanwhile, write us for detailed literature.

CONTRACTORS!

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"WALTER TRACTOR TRUCKS
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Economize
Road surfacing's
EASY with your
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Old? Yes!... The BERG has been on the market since 1924.
But NEW, TOO... constantly improved, until today it provides the fastest, easiest, most effective, most economical method available.

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4885-4889 Spring Grove Ave. Cincinnati, Ohio

Equipment Distributor Doings

Open House in Bronx Is Held by Frantz Co.

Despite heavy and persistent rains, more than 300 contractors and other guests turned out for an open house held last month by the Frantz Tractor Co., construction equipment dealer of New York City. Occasion for the party was the opening of a new parts and service building in The Bronx.

Officials of the company were on hand to greet the guests, to serve them sandwiches and drinks, and to show them the equipment and services available from Frantz. Shop personnel demonstrated internal and operational features of the various pieces of equipment, and the contractors themselves had plenty of opportunity to get at the controls of the machines.

Manufacturers and their representatives were also on hand to explain the features of their equipment, and to get acquainted with the contractors. Among the companies represented by Frantz are Allis-Chalmers Mfg. Co., Baker Mfg. Co., Gar Wood Industries, Inc., La Crosse Trailer & Equipment Co., The Miller Spreader Corp., Milwaukee Hydraulics Corp., Rodgers Hydraulic, Inc., Pacific Car & Foundry Co., N. P. Nelson Iron Works, Inc., Schramm, Inc., Tractomotive Corp., and others.

Frantz plans to make further additions for showrooms and extra offices, and expects to complete them soon.

Wm. J. Faulkner has joined the Frantz Tractor Co., Inc., as Vice President and General Manager. Mr. Faulkner formerly was Industrial Sales Manager for the Allis-Chalmers Mfg. Co.

Finisher Dealerships Open

Dealerships in several territories are available for handling the Johnson mechanical float finisher. Patents to this machine have been acquired by the Madsen Iron Works, which formerly manufactured the Johnson finisher in the eleven western states under a license agreement. Madsen now plans to increase its dealerships throughout the United States, and those interested should write to Madsen Iron Works at 5631 Bickett St., Huntington Park, Calif.

Northwest Agent for Noble

Bow Lake Equipment Co. is the new distributor for Noble Co. products in western Washington and in British Columbia. It will handle the firm's batching plants and other cement and aggregate-handling equipment. Other lines handled by Bow Lake include those of the Chain Belt Co. and the Le Roi Rix line.

Conrad Creim is President of Bow Lake; Scott Simenstad, Vice President; and Mrs. Marjorie R. Creim, Secretary-Treasurer.

Midwest Dealer for Lima

The Buchanan Co. of Kansas City, Mo., has been selected as sales agent by the Lima Shovel & Crane Division of the Lima-Hamilton Corp. Buchanan will handle sales of Lima shovels, cranes, and draglines in the states of Oklahoma, Kansas, and western Missouri, from its headquarters at 1710 Grand Ave.

Organizer of the company is Hugh H. Buchanan, formerly with the Lima Shovel & Crane Division, and the Michigan Power Shovel Co., Benton Harbor, Mich.

Company Aids Dealers By Touring Equipment

On-the-job demonstrations of its equipment are now being conducted by The Huber Mfg. Co. of Marion, Ohio. As an aid to its distributors, this company has provided for two touring outfits to show its standard maintainer and its 3 to 4-ton tandem roller with a third-roll attachment. The maintainer is carried on a Federal truck and has a Lift-Loader and bulldozer auxiliaries. The roller is towed along on a companion trailer.

Huber distributors are notified in advance of the caravan's arrival, and selection of the sites and invitations to the affair are left to them. The demonstration is put on by factory-trained operators, and usually takes from 2 to 3 hours. They discuss the why's and wherefore's of Huber design and answer any questions which may be brought up by the contractors and highway engineers in the audience.

The equipment has given demonstra-



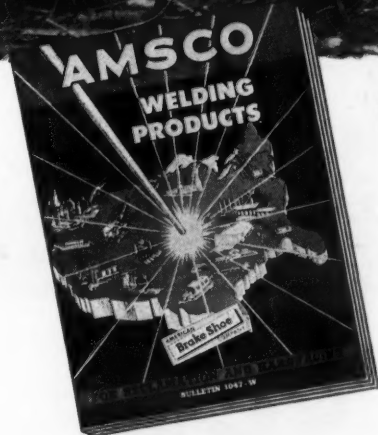
This is one of the Huber demonstration units which is touring the country as an aid to the firm's dealers. A Huber maintainer with Lift-Loader auxiliary is carried on the truck bed. A Huber 3 to 4-ton tandem road roller with a third roll is towed on a specially built companion trailer.

tions in Texas, Oklahoma, Mississippi, Louisiana, Arkansas, Tennessee, North and South Carolina, Georgia, Alabama, and Florida. One of the units presently on the road is covering the midwest and will move into New England in the autumn. The other outfit is operating in the western states.

Pump Co. Dealer; Sales Office

The appointment of a distributor for western Michigan has been announced by Economy Pumps, Inc., of Hamilton, Ohio. Bruce Hetler, named as western Michigan distributor, makes his head-

(Concluded on next page)



when AMSCO CONSERVATION WELDING
comes into the picture!

Every equipment and machine part consigned to the scrap pile leaves its "red ink" mark in your ledger: the cost of replacement, the paralyzing of equipment while waiting for hard-to-get parts, the slow down of the job you're handling. This new welding products bulletin shows how to keep equipment producing by keeping parts out of the scrap pile with Amsco Conservation Welding.

All Amsco welding products are developed solely for the reclamation, rebuilding, repairing, and hardfacing of equipment parts subject to wear. For a fraction of replacement costs, damaged or worn parts can be restored quickly to full usefulness; or new parts can be protected before use to multiply their ordinary service life many times.

Take wasteful scrap piles off your list of "necessary evils", and wherever impact, abrasion, and frictional wear are cutting into your profits put Amsco cost-cutting welding products to work. Send for free Bulletin 1047-W today—it's a complete, fully illustrated guide to WHAT welding rod or electrode to use.

FREE!! New Amsco Welding Products Bulletin 1047-W

Gives complete characteristics and specifications for each welding rod or electrode. Over 90 drawings and on-the-job photographs show ingenious shortcuts. Handy alphabetical index gives, for each major field, the exact rod for almost every specific application. (Available soon: Bulletin on Amsco Tungsten Carbide welding rods, electrodes, inserts and bulk metal.)

AMERICAN

Brake Shoe

COMPANY

AMERICAN MANGANESE STEEL DIVISION

CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. Made and sold in Canada by Canadian Ramapo Iron Works, Inc., Niagara Falls, Ont.



MANGANESE STEEL CASTINGS
"CHROME-MOLY" STEEL CASTINGS
HARDFACING ELECTRODES
GRINDING MILL PARTS



DIPPERS DREDGE PUMPS CRUSHER PARTS

CHAINS

SOLIDS PUMPS

BUCKETS

WHEELS

Distributor Doings

(Continued from preceding page)

quarters in Grand Rapids.

The opening of a sales office in Chicago has also been announced. Belden S. Tucker is District Sales Manager in charge, located at 105 W. Monroe St.

Penn Salesman in Mineola

Harold (Hal) S. Barber has been added to its Mineola sales force by the H. O. Penn Machinery Co., Inc., of New York City.

Ralph B. Carter Dealers

The Ralph B. Carter Co., Hackensack, N. J., has announced the appointment of three dealers to handle its complete line of Humdinger pumping equipment.

This line includes both diaphragm and self-priming centrifugal pumps.

The Rutland Road Machinery Co., Rutland, Vt., has been given that part of the state south of Burlington. The Kimball Equipment Co., Salt Lake City, Utah, will cover the state of Utah, and the Wyoming counties of Lincoln and Uinta. The Equitable Equipment Co., New Orleans, La., will cover the state of Mississippi south of and including the counties of Warren, Hinds, Rankin, Scott, Newton, and Lauderdale. Equitable will also cover Mobile County in Alabama, and all of Louisiana with the exception of the northwest portion around Shreveport.

LeTourneau Dealer in Okla.

Kessler-Simon Machinery Co. has been appointed LeTourneau distributor for the state of Oklahoma. The firm is located at 1545 Exchange Ave., Oklahoma City, Okla. It was organized in 1942 by E. L. Kessler, who was joined by A. E. Simon in 1944. The company

moved to its new quarters in November, 1947. It handles a complete line of construction equipment and contractors' supplies.

Minn. Dealer for Hall-Scott

Great Lakes Auto Parts & Machine Works, Inc., Duluth, Minn., has been selected as distributor for the Hall-Scott Division of ACF-Brill Motors Co. Great Lakes will handle truck and industrial engine sales and service in the states of Minnesota, northern Wisconsin, and the upper peninsula of Michigan. Erick Johnson is President of the Duluth organization.

Davey Dealer in New York

Larkin Machine & Equipment Co., Inc., Rockville Centre, N. Y., has been granted a full dealership by the Davey Compressor Co., Kent, Ohio. Larkin will cover the New York counties of Nassau, Suffolk, Queens, Kings, and Richmond.

Ohio Dealer for Gumout

The Tresler Oil Co., 4015 River Road, Cincinnati, Ohio, has been named a distributor of Penn Drake Gumout by the Pennsylvania Refining Co., Cleveland, Ohio. Gumout is a liquid solvent for removing gum accumulations from carburetors, fuel systems, and other parts subject to that type of attack.



The versatile air hose coupling for every construction job. Quick-acting, universal type. Plain design; strong, durable, safe. Malleable iron (cadmium plated) or bronze. Hose ends with shanks; male and female I.P.T. ends. Shanks for hose are long, well corrugated and smoothly finished. Sizes $\frac{3}{8}$ " to 1".



I.P.T. Female End
Sizes $\frac{1}{4}$ " to 1"



I.P.T. Male End
Sizes $\frac{1}{4}$ " to 1"

Locking heads are same in all sizes of hose and threaded pipe ends. Any two sizes of hose, or hose and pipe, within the coupling's size range, can be quickly coupled without extra fittings of any kind.

PATENTED LOCKING ARRANGEMENT

Designed for positive safety in service involving excessive twist or vibration. Locking ends are fastened together in such a way that they cannot come apart until locking device is removed.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods

IF IT'S A **DIXON** PRODUCT

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Main Office and Factory: PHILADELPHIA, PA.
BRANCHES: CHICAGO, BIRMINGHAM, LOS ANGELES, HOUSTON

STOP

at Booth 1238 at the Road Show
July 16-24

for a copy of the July issue of

CONTRACTORS AND ENGINEERS MONTHLY

the most complete directory of manufacturers serving the highway and heavy construction field we have ever published.



Equipment

HERE'S MODERN

THAT RINGS THE BELL

MIXERS

BIN BATCHERS

PUMPS
RADIAL SAWS



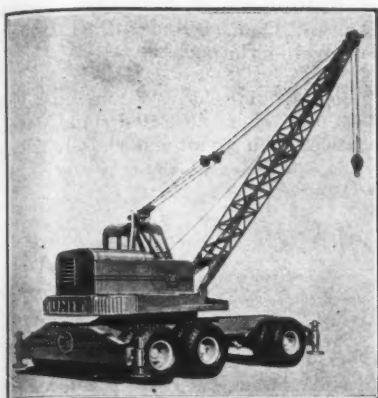



Plus THESE
MODERN TIME
SAVERS

JETCRETE GUNS
TILT-TABLE SAWS
BUCKETS • HOPPERS
ELECTRIC PLANTS
HOISTS • CARTS

One of the big advantages of using CMC Equipment is that you know there will be no question about PERFORMANCE. You get the kind of results you want, and and have a right to expect, because CMC units are planned, engineered, built and sold to perform specific work—and they do it.—For the complete story see your CMC Distributor or write

CONSTRUCTION MACHINERY CO'S.
WATERLOO, IOWA



Visitors to "the greatest show on earth" next month will see among new machines on display the Unit 1520 self-propelled 3-axle Mobile Crane.

Preview of Exhibits At ARBA Road Show

(Continued from page 1)

Show, here is an advance guide to some of the exhibits. It is in the form of a list of exhibitors, alphabetically arranged, with their booth numbers and the machines and materials they will display. The rest of the exhibitors will be listed in the July issue of *CONTRACTORS AND ENGINEERS MONTHLY*, and copies of that issue will be available during the Road Show at the C. & E. MONTHLY booth, No. 1238. Representatives of the editorial and business departments will be on hand there.

The hours of the Road Show will be from 10:00 a. m. to 7:00 p. m.

Aeroil Products Co., Inc., will occupy Booth SC-3812. It will exhibit its combination tool heater and asphalt-binder kettle; its Model 120-DVP heating and melting kettles for rubber-asphalt joint-sealing compounds; and its Model 746 Heet-Master road builders' asphalt kettle. The Aeroil-Schramm power-driven weed burner will also be shown. General Manager Milton M. Yarrington and Midwest Branch Manager Robert H. Willemms will be in attendance.

Aeroquip Corp. will have Booth 4504 and will display its flexible hose and fittings, its Self-Sealing and Breakaway couplings, and will demonstrate its Hydraulic scope. Key personnel at the booth will include L. J. Henderson, M. W. Brandau, E. Nielson, and others.

Allis-Chalmers Mfg. Co. will be at Booths 3204-3401-3601. Feature of its exhibit will be the HD-19 torque-converter tractor, the HD-5 crawler tractor, and the AD-4 motor grader which will be shown for the first time. Power units in several models will be on display, as well as some 57 tractors fitted with all types of allied equipment. Cutaway models of motor graders, power units, and both live and dry torque-converter units will reveal the mechanical functions of all essential parts. Movies are also planned.

American Hoist & Derrick Co., at Booth 3219, will have its general-purpose hoists on display—including Models 25, 40, 55, 75, and 100—as well as its blocks and sheaves, the Handiwinch, Crosby wire-rope clips, the American portable material elevator, and, for the first time, the new traction winch for wheel-type tractors. Company representatives at the booth will include S. M. Hunter, P. S. Gough, S. C. Brown, J. L. Beard, J. F. Bishop, L. E. Coulter, R. J. Dervey, R. L. Thomson, and William Kennedy.

Anchor Coupling Co., Inc., has been assigned Booth 1614, where it will exhibit factory-fabricated hydraulic hose assemblies; wire-braid hose for high, medium, and low-pressure duty; fabric-reinforced medium and low-pressure hose; adapter unions, angle and straight; clamp-type couplings for high-pressure

hose, for emergency repair and field service; reusable couplings for medium and low-pressure hose; and spring guards. The following company personnel will be on hand at the booth: J. David Luebke, Sales Manager; and Representatives T. L. Boyne, W. E. Hooker, H. E. Sorensen, H. J. Zilske.

Anthony Co., at Booth SC-3810, will exhibit its hydraulic-hoist dump bodies; hydraulic platform-body hoists; and the Lift Gate, an elevating tail-gate for loading and unloading trucks. J. G. Reinhard, C. H. Worrells, Frank Novotney, and Ed Bellows will be in the booth to demonstrate the equipment.

Armco Drainage & Metal Products, Inc., exhibit will be housed in an Armco Steelox building at Booth 3804. A flow model on display there will show the advantages of Pipe Arches and end sections. Company products on view will include standard corrugated and Multi-Plate drainage structures, Hel-Cor per-

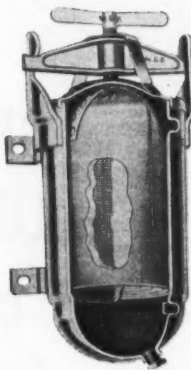
(Continued on next page)

For all Kinds of Oil and Motors

WGB Clarification is Economy

MR. FLEET OPERATOR: When you received your Autocar, Brockway, Buda, Diamond T, General Motors or Mack Motor equipped with a WGB Clarifier, you obtained the best filtration that money can buy—provided you use genuine WGB cartridges, which are covered by patents preventing duplication. But if you use substitutes, which are prevented from using the WGB principle, you cannot expect WGB economy or motor protection.

Descriptive literature sent on request



The results which have induced manufacturers to equip their fine motors with WGB Oil Clarifiers were obtained by use of the complete unit. It is not WGB filtration unless genuine WGB cartridges are used. Substitutes cost more because they do less. Be fair to yourself, to your motor and to the WGB Clarifier. Use genuine WGB cartridges and you'll get the economy, efficiency and motor protection which the manufacturer intended you to have.

W. G. B. Oil Clarifier, Inc.

139 Cornell St.
Kingston, N. Y.



NO SCALDED WORKMEN

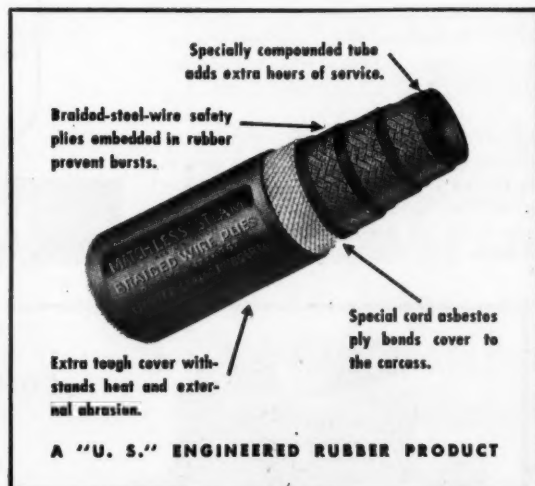
The service which a Pile Driver Steam Hose must stand is mighty severe, and it is hazardous. Operating conditions are not ideal, particularly on river work.

High steam pressures are now common. Many times oil is mixed with the steam, and rubber that will stand both oil and steam at high pressures is the big problem.

Cotton duck under constant high-pressure steam heat soon chars and becomes brittle, but operators oftentimes cannot SEE that a hose is about to fail. Workmen can be severely burned from bursting Pile Driver Steam Hose.

U. S. MATCHLESS PILE DRIVER Steam Hose is made of Braided High Tensile Steel Wires over the finest available Steam Resisting Rubber. When the rubber tube finally fails, the steam merely trickles through and gives ample warning. Asbestos Cords and a Thick Rubber Cover protect against heat when handling.

U. S. Matchless has built up outstanding records of hours in Pile Driver Service—and NEVER A BURST or burned employee.



U. S. ENGINEERED RUBBER PRODUCTS FOR THE CONTRACTOR

Hose—Belting—Gate Seals and Water Stops—Hydron

MADE BY

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES
RUBBER COMPANY

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

forated pipe, tunnel liner plates, sheeting, Flex-Beam guard rail, bin-type retaining walls, and spiral welded pipe foundation piles. Company headquarters representatives at the Show will be S. R. Ives, H. D. Neill, G. E. Shafer, H. L. White, W. T. Adams, J. M. Robertson, O. M. Carter, W. J. Kropf, J. H. Cox, R. K. Leedom, C. W. Carleton, S. M. Gross, H. E. Ingwersen, and W. H. Spindler.

Austin-Western Co. will show models of its motor graders, road rollers, power shovels, street sweepers, and crushing equipment at Booths 2611-2412. The following company personnel will be at the booth to answer questions: Executive Vice President R. K. Stiles, Sales Promotion and Advertising Manager H. F. Barrows, Service Manager H. Wuestenberg, and Chief District Manager H. P. Lockhart.

The Baker Mfg. Co. has been assigned Booth 3112, where it plans to exhibit its bulldozers, Gradebuilders, snow plows, power-control units, and rippers—the last two items to be shown for the first time in public. J. G. Miller, H. W. Rabe, L. D. Craggs, G. D. Phares, W. C. Staley, V. C. Crane, H. H. Washbond and R. V. O'Keefe will be in attendance.

Barber-Greene Co., at Booths 2203-1240, will have some new equipment to show the public. First, the Model 845 utility bituminous plant, a portable plant in the 60-ton per hour range. With it will be the B-G maintenance plant, consisting of an 840 mixer and 830 drier. A Model 879A Tamping-Leveling Finisher will round out the bituminous-plant display. The 358 hopper-car unloader and 363 portable conveyor-loader-stockpiler unit recently announced will be on display. In the exhibit of B-G bucket loaders will be the Model 545A, the 82A crawler-mounted model, and the 522. Shown for the first time will be the new Runabout Model 705 ditcher, a mounted unit which digs trenches 5½ inches wide down to 4 feet deep. The Model 44-C vertical-boom ditcher and the Model 720 will also be on hand. A permanent conveyor unit on display will illustrate B-G standardized design. A new heavy-duty portable belt conveyor will also be shown. Road builders will be interested in a three-dimension color film called "Highway, U. S. A." which Barber-Greene will present in a special stereo theater. The film has been in preparation over a year, and captures scenes of road builders' work all over the country. H. A. Barber and W. B. Greene head the list of the many company officials who will be at the booth.

Barco Mfg. Co. headquarters will be at Booth 3862. The company's new gasoline-driven rammer for soil compaction will be displayed for the first time, along with its gasoline-driven paving breakers and rock drills. R. J. Blom-

seth, E. R. Boddinhouse, J. H. Brown, L. P. Oelschlager, and W. S. Withers will be in attendance at the booth.

Bay City Shovels, Inc., will present the Model 180-T66 CraneMobile for the first time, at Booth 3874. The unit is mounted on pneumatic tires and has a

crane boom with an adjustable jib. Also to be shown: the Model 65 1¼-cubic-yard crawler-mounted shovel, diesel-powered; and the Model 30 heavy-duty ½-yard crawler-mounted gasoline-driven excavator equipped with a backhoe attachment. Several company representatives will be on hand including

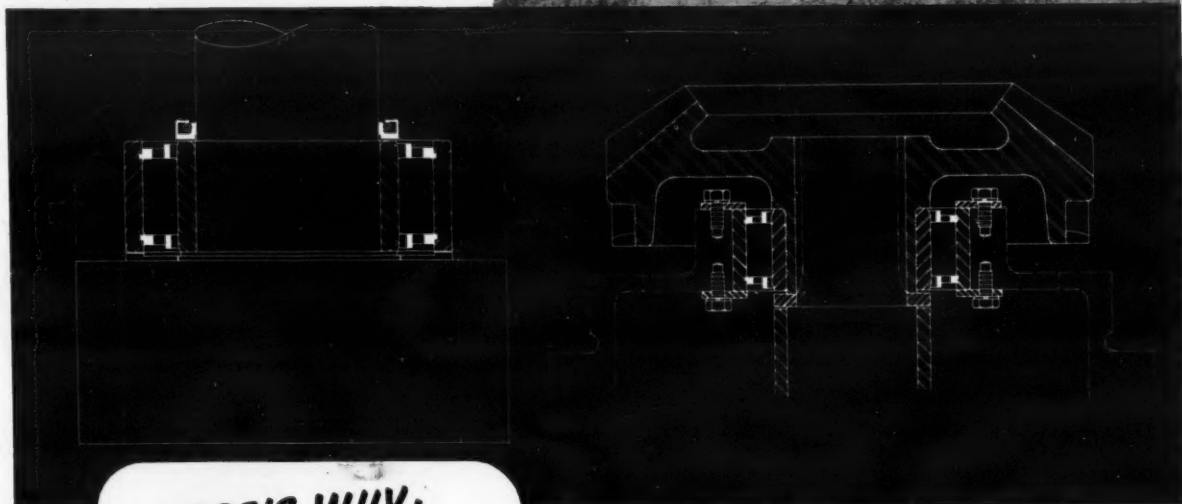
A. W. Reidinger, F. A. Phillips, Morgan Ramsay, O. P. Dulude, Shirl Brown, and Walter Harbuck.

Bell Aircraft Corp., occupying Booth 4303, will offer the Bell Prime Mover, a powered buggy for materials-handling. (Continued on next page)

GREATER STRENGTH LONGER LIFE...

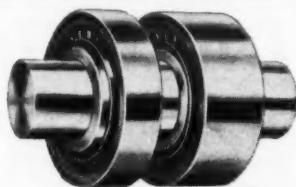
Compactness, too in the
Swing of #4500 Manitowoc
Speedcranes

HERE'S HOW:



HERE'S WHY:

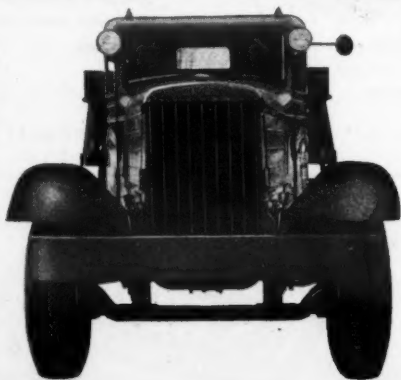
By selecting Hy-Load WIDE Series Roller Bearings Manitowoc Engineers achieved maximum radial load capacity, without increasing shaft size or housing bore diameter. Thus, in addition to compactness, this extra bearing capacity adds to the strength and life of the entire swing assembly.



Showing comparative width of
Hy-Load WIDE Series Bearing

Better performance, for years and years—reduced power requirements, minimum maintenance, freedom from "fussy" adjustments—these are features which contractors want in the equipment they buy. In shovels, pavers, graders, rollers, trucks and tractors, Hyatt Roller Bearings have been living up to these promises for over half a century. Whether you build, sell or buy equipment, remember: Hyatts mean extra value and extra satisfaction. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS



CUT
CONSTRUCTION AND ROAD MAINTENANCE
COSTS

WITH SPECIALLY DESIGNED TRUCKS
SERVING THE ROAD MAINTENANCE FIELD
FOR OVER 40 YEARS

Limited Territory Available

Duplex Truck Company
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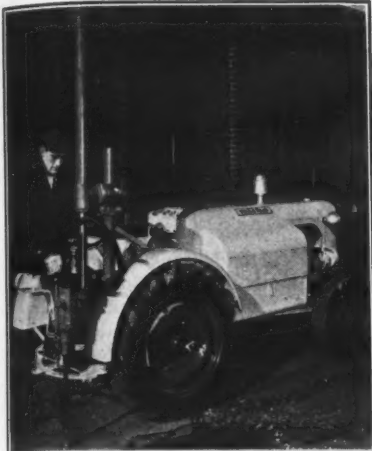
To _____

(New address)

Name _____

Firm _____

Position _____



Le Roi will feature at Booth SC-3102 its new Trac-Jac mobile air-feed sinker drill on a Tractair tractor compressor. It is designed for Mud-Jack work or other shallow-hole drilling.

introduced last January in Cleveland during the Materials Handling Exposition. Stationed at the booth will be Sales Manager L. S. Kimball, Eastern Regional Sales Manager J. W. Perry, and Factory Representatives R. G. Ervin and J. J. Phelan.

Bethlehem Steel Co., Inc., will exhibit at Booth 1603. It will feature the following items, embodying some new changes in design and construction: the Bethlehem standard dowel unit which can be used completely assembled as a contraction joint or, with the addition of a joint filler, as an expansion joint; a new tubular bridge rail of cold-rolled sections; standard cable guardrail and standard safety beam guardrail; and standard combination guardrail and hub guard which use cold-formed sections.

The Black & Decker Mfg. Co., at Booth 1005, will display its portable electric tools and its new Hi-way Loadometers, or portable scales, which are electrically operated. J. F. Apsey, Jr., J. N. Baker, W. G. Burggraf, and E. E. Powell will be on hand to greet visitors and show them around.

Blackhawk Mfg. Co., will display models of its hydraulic pumps, valves, and rams; its wrenches; its special hydraulic jacks; and its Porto-Power unit. Hal Goehrig, John Merker, Bill Traut, and Bob Wacker will be in attendance at Booth 1230.

Broderick & Bascom Rope Co. will demonstrate a miniature wire-rope strander at Booth 1208. The model actually forms 19 wires into a single strand and 6 strands around a hemp center into a finished rope. The company's wire rope and wire-rope slings will also be exhibited—both standard and braided safety construction. F. Zimmerman, G. T. Born, K. B. Britt, J. J. Sieber, and E. F. Graubner will be at the booth.

Bucyrus-Erie Co. will exhibit a full line of tractor equipment for International crawler tractors at Booth 2502 and at the International Harvester Booth. At its own booth it will show cable-controlled and hydraulic-controlled scrapers, 4 and 2-wheel units, including its newest scraper, the S-type; bulldozers for TD-14 and TD-18 tractors; a cable-controlled Bullgrader for the new TD-24 and a hydraulic-controlled Bullgrader for the TD-9; a dozer-shovel mounted on a TD-6; and rear and front-mounted winches, P-25 and P-15 respectively, for TD-24 bulldozer or Bullgrader control. At the International Harvester exhibit, Bucyrus-Erie equipment will include a cable-controlled Bullgrader, pusher plate, rear-mounted P-28 power-control winch, CR-4 heavy-duty ripper, and 22-cubic-yard scraper for the TD-24 tractor; a hydraulic-controlled Bullgrader and a cab for the TD-18; a dual-unit combination of hydraulic Bullgrader with front-mounted hydraulic pump, and a 5-cubic-yard 2-wheel rear-dump scraper for the TD-14; a dozer-shovel and cab mounted on a TD-9; and a hydraulic bulldozer and a

dozer-shovel mounted on a TD-6. At Booths 1018-1219 Bucyrus-Erie will also have a photographic display of its $\frac{3}{4}$ to 2 $\frac{1}{2}$ -yard excavators.

The Buda Co., occupying Booths 2404-2603, will exhibit a line of power units from the one-cylinder Model 1-BD-38 5-hp engine up to its new 8-DCS-2505 410-hp engine, shown for the first time. A complete line of heavy-duty automotive diesel engines will be arranged in

a 4-step display. Buda will also show models of generator sets from 2 $\frac{1}{2}$ kw to 125 kw, a moving display of its complete line of lifting jacks and nozzle testers, and its new HBL hydraulic earth drills, also shown for the first time. The latter will be operating models and will demonstrate methods of drilling holes for guardrails, pre-boring for piling, etc. One drill will be mounted on a heavy-duty truck powered by a Buda diesel

(Continued on next page)



Hydraulic Spreader gives

- ✓ Controlled Speed
- ✓ Controlled Density
- ✓ Controlled Direction

City, county and state highway departments use Hydro Spreaders because they provide the safe, sure way of spreading icy streets and roads. Easily installed on any dump truck with hydraulic hoist.

Material can be spread from 9 ft. to 35 ft. at speeds up to 30 m.p.h. All sprockets and chains are fully enclosed and material can be dumped over spreader without damage. One man can drive truck and operate spreader from cab.

An exclusive Hydro Spreader feature is the automatic gate opening device. When the driver starts the spreader the gates open and as the spreader is stopped the gates automatically close. There is no waste of material when spreader is not in operation. Hydraulic Spreaders are guaranteed to be free from defects in either materials or workmanship. Immediate delivery.

Write for illustrated folder.

Dealer territory available.

Paul M. Cole Company, National Distributor, 30 N. La Salle St., Chicago, Ill.

Hydro Spreader Corp. 247 Madison Street
Waukesha, Wisconsin

MARTIN CARRYHAUL TRAILERS

TRADE MARK REGISTERED

MARTIN MACHINE COMPANY
KEWANEE, ILLINOIS

MARTIN CARRYHAUL TRAILERS "Make Hauling A Pleasure!"

Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field. Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.

See me at the Road Show

the FOOTE Kinetic mixer

BOOTH 3106
SOUTH CONCOURSE

FOOTE

MULTIFOOTE CONCRETE PAVERS
ADNUN BLACK TOP PAVERS
Kinetic ASPHALT MIXERS

• Here will be a good chance to look me over — the first really small asphalt plant for handling your patching jobs. You can find out for yourself that even though the Foote Kinetic Mixer is small, I am well built, amply powered and fully able to deliver 3 cu. ft. of asphalt mix in 30 seconds.

Here is a chance to have all your questions answered and learn how you can handle those jobs like driveways, tennis courts, shop floors and patching, profitably.

See me at the Road Show, July 16-24, Soldier Field, Chicago, and in the meantime ask for Bulletin K-100.

THE FOOTE COMPANY, INC.
1916 State Street Nunda, New York

(Also see page 96)

Advertising columns of the July **CONTRACTORS & ENGINEERS MONTHLY** will comprise the most complete directory of manufacturers serving the highway and heavy construction field we have ever published. Extra copies will be available at the Road Show, Chicago, July 16-24.

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

engine. L. F. Shoemaker, R. R. Hughes, R. K. Mangan, L. Schultz, and others will be at the booth.

Buffalo-Springfield Roller Co. will show its complete line of road-roller models at Booth NC-2612, with four company representatives in attendance—Murray D. Shaffer, R. H. Dean, John P. Griffin, and G. P. White.

Butler Bin Co. will display new aggregate and cement batching and storage equipment at Booth 3015, with Kenneth P. Kerr in charge.

Calcium Chloride Association will distribute literature on the proper use of calcium chloride, at Booth 2108. Colored photographs will show how the chemical is used in road construction and maintenance. George H. Kimber, W. E. Dickinson, Joseph B. James, and Kenneth E. Trombley will be at the booth.

Ralph B. Carter Co.'s exhibit of diaphragm and self-priming pumps will be at Booth 1403. Shown for the first time will be a 1½-inch electric-drive self-priming pump. F. E. Lewin, J. J. Horgan, and R. B. Carter, III, will preside over the display.

C. H. & E. Mfg. Co. will be at Booth 1607, with an exhibit of its pumps, hoists, tandem rollers, and woodworking machinery. It will feature a new tandem roller and a new line of hoists. John H. Hase and Frank F. Hase will be at the booth.

Chain Belt Co. will occupy 15,000 square feet comprising Booths 2406-2605, and will show about \$100,000 worth of Rex construction machinery. Highlights of the display will be the streamlined Rex single and double-drum pavers, and the Rex Pumpcrete in operation. Other construction machinery there: Moto-Mixers, Rex concrete mixers, Speed Prime pumps, a chain and transmission display, and a conveyor and process-equipment display. There will be movies and slide films about Rex machines, and short talks by sales and engineering personnel.

Chicago Pneumatic Tool Co. will show four new road service tools for the first time, at Booths 2402-2601 near Gate 28. First is a self-contained gasoline digger and backfill tamper, a magneto-ignition tool which starts with a downward push of one of the handles. Second is a 2-kw gasoline generator which powers two one-man concrete vibrators for smaller pouring jobs. Third is a utility winch in gas, electric, or air models. Fourth is a new 2-stage air compressor of 7½ or 10 hp for running small hand tools. The company will also show a representative line of its sinker drills, demolition tools, impact wrenches, wood borers, grinders, portable compressors, diamond drills, etc.

C. I. T. Corp. will participate in the Road Show with a display booth, No. 1220, located in the Exhibition Hall.



Here's the new Barber-Greene Banabout ditcher, Model 705, to be shown for the first time at the Road Show. It digs a trench 5½ inches wide down to 4 feet deep.

Representatives from each of the company's five regional offices will be in attendance. They will explain to visitors how the company finances the purchase and sale of construction equipment.

And they will be prepared to render financing service right on the spot, so that contractors and distributors who wish to transact business at the Show can get immediate action.

Cleaver-Brooks Co. products to be shown at Booth 2602 include a packaged steam generator, 125-hp, oil-fired, available with gas engine or electric motor, and suitable for trailer or truck mounting; a portable tank-car heater, oil-fired, available in two sizes and in either skid or trailer mounting; and a bituminous booster for direct heating of bituminous materials in tank cars.

The Cleveland Trencher Co. will present at Booth 3817 its Models 92, 95, 110, 140, and 320 trenchers; its Model 90 backfiller; and its new trailers, Models T-10 and T-6. Vincent Penote, John Penote, J. Roy Overs, N. V. Grund, N. J. Greeney, A. R. Askue, N. J. Dodds, and F. N. Fetzner will be on hand to show visitors around.

Concrete Transport Mixer Co. will be represented at the Show, in Booth 3854, by the Hunkins' Hi-Lo truck-mixer recently announced and the Transport high-discharge truck-mixer.

(Continued on next page)

SPEED CONSTRUCTION WITH



When building this new addition to the Upjohn plant at Kalamazoo, Mich.,

The Austin Company chose a Bay City CraneMobile. Being repeat

buyers they knew from experience that the speed and efficiency

of CraneMobile power, maneuverability and versatility

worked hand-in-hand with the speed and efficiency

of The Austin Method. The CraneMobile will

serve you too, with fast, economical performance

on steel erecting and material handling.

Get full particulars from your

nearest Bay City dealer or write to

BAY CITY SHOVELS, INC.,

BAY CITY, MICHIGAN.



BAY CITY

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS

SEE YOUR NEAREST DEALER FOR BAY CITY EXCAVATING AND MATERIAL HANDLING EQUIPMENT IN SIZES FROM ¾ TO 1¼ YARDS HAVING CRANE RATING UP TO 20 TONS. BOTH CRAWLER AND PNEUMATIC TIRE MOUNTING.

TRANSITS and LEVELS

**HEADQUARTERS for
REPAIRS—any make**

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog CE-46 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

WARREN-KNIGHT CO.

Mfrs. of Sterling Transits & Levels
136 N. 12th St. • Philadelphia, Pa.

Construction Machinery Co.'s Booths, Nos. 3018-3211, will feature concrete mixers, pumps, batching equipment, floodlighting equipment, power saws, etc.—almost all new models, many on display for the first time. The Jetcrete gun for applying concrete pneumatically will be shown, along with a new gas-electric radial saw, a portable Batch 'N Mix plant, etc. President L. S. Holden and Vice President G. A. Loveall will head the CMC contingent, which will include Lee Parker, Paul Weideman, R. C. Scott, Harry Wilson, and others.

Continental Motors Corp., at Booths 1417-1609-1616, will exhibit nine industrial engines ranging from a 1½-hp to a 175-hp engine. Overhead-valve engines will include a gasoline and a diesel model, both exhibited as closed power units. The L-head models will include two closed power units, one open power unit, and one bare engine. Three will have gasoline carburetors, and one will have natural-gas carburetion. The company will show for the first time its recently announced Multi-Tool power unit with 1½-hp capacity. Other small power packages will include the company's AA-7 and AU-7 single-cylinder air-cooled engines and the Tiny Tim generator set. The transportation engine exhibit will include three L-head gasoline models, two overhead-valve diesels, four overhead-valve gasoline models, and one overhead-valve fuel-oil model. Feature of the exhibit will be a slide film about Continental and its products, and the improvements it has made in its production facilities since V-J Day.

Contractors Machinery Co., Inc., will show its Trojan Patrol and its Trojan angling dozer as part of the International Harvester Co. exhibit at Booths 2207-2407-2503. R. G. Allan, W. F. Flanagan, and F. W. Allan, Jr., will be available to answer questions.

The F. D. Cummer & Son Co. will display no equipment, but it will have catalogs, photos, etc., at Booth 1866. A. W. Bollard will be in charge.

Cummins Engine Co., Inc., at Booth 1011, will demonstrate an activated cut-away model of its Model NHBS-600 diesel engine. It will also show its fuel pump in a cutaway model, and the following Cummins diesels—Models NHBID-600, NHPS-600, HBIS-600, HI-600, and LI-600. L. W. Beck, President—Sales; P. J. Every, Manager of Regions; and the company's regional sales managers will be in attendance at the booth.

Davey Compressor Co. will offer representative models from its line of air compressors and mobile machine shops, at Booth 3870. J. T. Myers, H. S. Nickerson, F. S. Mackeigan, and L. W. Darling will be in charge.

Detroit Diesel Engine Division of General Motors Corp. will feature its latest addition to the GM Series 71 diesel line—the Twin-4 236-hp Model 8103 which was just introduced. Other members of the Series 71 family on exhibit will include the Twin-6 349-hp diesel, the 6-cylinder 183-hp vehicle-type diesel, the 4-cylinder 120-hp packaged power diesel, the 3-cylinder 93-hp and the 2-cylinder 58-hp fan-to-flywheel diesels. Visitors will be able to see a movie called "Diesel, the Modern Power", and demonstrations of the General Motors unit fuel-injection system. E. F. Bentley, Contractor's Equipment Sales Manager, will be in charge of the exhibit at Booth 1001.

Diamond Iron Works, Inc., will be represented at Booth 3830 by a Diamond Model 66 portable Rotor-Lift gravel-crushing and screening plant. Company officials at the booth will include L. J. Reay, President; F. H.

Jusenius, Vice President in Charge of Sales; and C. L. Vader, Assistant General Sales Manager.

Dotmar Industries, Inc., will show its recently announced Speedmaster curb and gutter paver at Booth 3232. Company President A. B. Suptek will be at the booth, along with M. J. Bell, W. A. Mucha, O. Volk, R. Bell, and J. Musick.

Drott Mfg. Co. announces that miniature working models of its equipment for crawler-type tractors will go through their paces at the company's space, No. 3842. They are built to a one-sixth scale and are powered by a motor. Regular-size Drott machines, mounted on tractors, will be on display at Allis-Chalmers, Oliver-Cletrac, and International Harvester exhibits.

Dumcrete Division of Maxon Construction Co., Inc., will have a Dumpcrete concrete truck body at the International Harvester exhibit. Company (Continued on next page)

IN THE SPOTLIGHT!



for safe, sure service

TUTHILL GUARD RAILS

Up-to-date highways need modern guard rail protection. Here's why it will pay you to install the TUTHILL Guard Rail:

Saves lives. The springy, convex rail keeps cars from going off the road. At night, too, it shows up clearly under headlights, plainly marking the course of the road.

Saves dollars. The one-piece, weatherproof Tuthill Guard Rail is simplicity itself. Easy and quick to erect. Never can sag. Requires little or no maintenance.

Be wise. Select the Tuthill Guard Rail for your highway installations.

TUTHILL SPRING CO.

762 W. POLK STREET, CHICAGO 7, ILLINOIS

NEW MOIL POINT... Breaks Concrete Through Engineered Wedge Action



DEALERS:
Immediate delivery on all ROCKBIT tools. Write for complete catalog.

Here at last is a moil point designed to make maximum use of the power in modern paving breakers. Rockbit Sales & Service Co. pioneers in moil point design, have developed the new Sabur Point to break concrete more efficiently, more quickly, and more thoroughly than has been possible with conventional old fashioned moil points.

Photographs at left show the curved shape of the Sabur Point. As the point penetrates concrete, this curved shape causes a sideways shattering action through its wedge-like design, thus relieving the point for its main job of penetration. These simple diagrams show how the Sabur Point continues to break concrete as it penetrates, long after the conventional moil point has stopped all breaking action.



Check the advantages of the new SABUR POINT:

- ✓ Scientifically designed to direct the force of impact.
- ✓ Saves money by breaking more concrete per man hour.
- ✓ Easy on the operator, less kick back. Practically impossible to stick.
- ✓ Streamlined for penetration and for splitting concrete.
- ✓ Shanks ground to exact tolerances.
- ✓ Strength where strength is needed.
- ✓ Will far outlast other points even under the toughest conditions.

Try the Sabur Point on your next concrete breaking job. You'll agree it is the greatest advance in moil point design since the advent of the paving breaker. Write us for details on how the new Sabur Point can help you.

ROCKBIT
SALES AND SERVICE CO.

ROCKBIT SALES & SERVICE CO.
2514 E. Cumberland Street, Philadelphia 25, Penna.
350 Depot Street, Asheville, N.C.

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

representatives at Dumpcrete's Booth 1858 will include Sales Manager W. W. Kingman, Fred Stock, Lantz Quackenbush, and Jack Hardcastle.

Eagle Crusher Co., Inc., at Booth 3222, will show its 20-36 jaw crusher, 12-24 and 36-42 hammermills, and its Model 400 truck-mounted bucket loader. The 36-42 hammermill will be shown in public for the first time. C. L. Wood, R. B. Wood, H. J. Miller, L. M. Gorton, and A. L. Balliet will be in attendance.

Eastman Mfg. Co. will exhibit at Booth 1844. Visitors will be able to inspect the company's hydraulic-control hose units and accessories, and its general line of couplings for all uses. A new reusable coupling for high-pressure hydraulic hose will be shown for the first time. W. D. Dalrymple, J. J. Birkenstock, W. F. Walker, F. X. Murphy, and D. J. Surfus will be on hand.

Electric Steel Foundry Co., at Booth 3844, will show Esco dragline buckets and dipper buckets, and a new product—Esco track walking shoes. Jefferson J. Davis, Tom P. Kirby, and John L. Oliver will show visitors around.

Electric Wheel Co. will display its disk wheels at Booth 1029, with J. B. Stillwell, J. Stefan, and R. H. Danhaus in attendance.

The Elgin Corp. will exhibit its Model 30 street sweeper at Booth 3224, along with its low-loading garbage and refuse-collection unit—the Leach Refuse-Getter. Following are the Elgin Corp. officials who will be at the booth:

George C. Dodge, President; C. W. Barnhouse, Vice President and Sales Manager; and A. M. Ferreira, Secretary. Leach Co. representatives will include E. C. Leach, President, and George S. La Borde. Elgin Sweeper Co. representatives will be President C. G. Parsons, and Chief Engineer A. E. Carlson.

E. D. Etnyre & Co. bituminous distributors and street flushers will be shown at Booths 3605-3406. On display for the first time will be a new component for circulating spray bars which relieves them of shock when an obstruction is hit. S. R. Etnyre, H. H. Etnyre, J. W. McCoy, and C. T. Hvass will be at the booth.

Felker Mfg. Co. will show its concrete-cutting machines, diamond-rim wheels, and diamond-core drills at Booth 4506. Monte D. Healey, Merle M. Allton, George Langtry, and James Maurseth will be in charge.

Findlay Division, Gar Wood Industries, Inc., will display its improved Model 70 shovel at the Road Show, a 3/4-yard unit combining a hydraulic coupling with a 65-hp diesel engine. It will show for the first time the recently announced Buckeye Model 312 pipe-line and utility ditcher, with an improved chain-driven digging wheel and a Twin Disc hydraulic coupling which furnishes power from a 67-hp diesel engine. It will also exhibit the Model F. G. Finegrader, the Models 401 and 406 general-utility ditchers, the Model 51 heavy-duty pipe-line ditcher, Model 120 service ditcher, Model 616 road widener, and Model S10 spreader. Gar Wood space will include Booths 3603-3404-3403-3206.

Fiske Brothers Refining Co. will feature its Lubriplate lubricants in Booth

1842 on the mezzanine floor of the Exhibition Hall. Moving exhibit units will demonstrate the product's suitability for construction equipment, and com-

pany sales and service engineers will discuss lubrication problems with visitors to the booth.

(Continued on next page)

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with
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Godfrey Trough Belt Conveyor

... a man-saver and money-maker for all producers of sand, gravel, crushed stone, cinders and other abrasive materials.

Like all Godfrey Conveyors, it combines power, rigidity and strength to a degree that insures many years of continuous service life at a low operating cost.

GODFREY CONVEYOR CO.

Elkhart 6, Ind.

ROCKFORD SPRING

LOADED CLUTCHES

LIGHT PEDAL PRESSURE

CUSHIONED ENGAGEMENT

VIBRATION DAMPENING

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DIRT EXCLUSION

HEAT DISSIPATION

LIFETIME ADJUSTMENT

* The life of ROCKFORD Spring-Loaded CLUTCHES is lengthened by the design of their cover plates. This feature provides maximum ventilation for the clutch. The openings in the top and sides supply a flow of air that promotes cooling and the escape of dirt and dust from the clutch. This life-lengthening cover design is one of several ROCKFORD advantages.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



ROCKFORD CLUTCH DIVISION

314 Catherine Street, Rockford, Illinois, U.S.A.

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STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST
... Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

THE CAP THAT DOES NOT FORGET TO CLOSE... Completely automatic—the "RAINCAP" is counter-balanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum with bronze bushing—can be installed in two minutes. F.O.B. Waterloo, Iowa.

Write Dept. C-1

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2	2 3/8"	1.90
3	2 3/4"	1.90
5	1 7/8"	1.90
55	2"	1.90
5x	1 3/4"	1.90
6	1 1/2"	1.90
66	1 3/8"	1.90
7	2 1/2"	1.90
8	3"	2.50
9	3 1/8"	2.50
10	3 1/4"	2.50
11	3 1/2"	2.75
115	3 3/4"	3.00
12	4"	3.00
123	4 1/8"	3.00
125	4 1/4"	3.00
14	4 1/2"	3.00



WATERLOO FOUNDRY CO., WATERLOO, IOWA

GIVE to the United Nations Appeal for Children



This pressure-type of indicator which shows the air content of freshly mixed air-extruded concrete will be demonstrated by the Portland Cement Association at the Road Show. This photo shows it on a job in the middlewest.

The Foote Co., Inc., will show its Kinetic concrete mixers in gas and electric models. It will also exhibit, at Booth 3106, the MultiFoote Duomix 34-E concrete paver, the MultiFoote single-drum 34-E paver with an inclined boom, and the Adnun Black Top Paver. Hosts at the booth will include D. D. Kennedy, J. C. Harford, Gerald Kennedy, James Clark, Frank Kemp, and J. D. Farrell.

Fuller Mfg. Co. will exhibit for the first time its new Model 5A1120 extra-large 5-speed transmission, in an activated cutaway version at Booth 1224. The new transmission is built for engines with a piston displacement up to 1,120 cubic inches. Other Fuller products to be shown include Model 5C650, a 5-speed unit-mounted transmission; Model 3T92, a 3-speed auxiliary with a full-torque power take-off built into the transmission case; an MHA remote-control unit exhibited with a model 5A43 transmission. Models 5C650 and 3T92 will be cutaway versions which show working parts.

Galion Allsteel Products Co. will take over Booths 1012-1213 to exhibit its hydraulic hoists. These are the models it plans to show: Model GH-567-A with an 8-foot 3-yard dump body; Model GH-577 with a 10-foot 4-yard dump body; and Models GH-60 and 58 hoists. B. J. Heiser, V. K. Gaston, R. Patzig, and R. H. Stevens will be at the booth.

Galion Iron Works & Mfg. Co. will have Booths 2206-2405-2408-2607 next to the information booth in the North Concourse, where it will display four sizes of motor graders and seven sizes of rollers. The following 1948 motor-grader models will be exhibited: the No. 116 extra heavy-duty, No. 102 heavy-duty, No. 202 medium-duty, and the No. 402 light-duty. Roller models will include the Chief 3-wheel and Warrior 3-wheel; the variable-weight 10 to 14-ton, 8 to 12-ton, 5 to 8-ton, and 3 to 5-ton; and the Galion portable roller.

Gardner-Denver Co., occupying Booth 2604, will exhibit for the first time its recently announced VP4 pneumatic sump pump, a new motor-feed wagon drill, and the B67 paving breaker. There will also be representative models of standard Gardner-Denver portable air compressors, rock drills, paving breakers and spaders, air motors, and wagon drills. R. H. Pearson, P. D. Sullivan, E. A. Linneman, and L. Loewe will represent the company at the exhibit.

The Garlock Packing Co. plans to display at Booth 1202 its line of mechanical packing, featuring seals for hydraulic application. H. J. Ramshaw, Ford Wilders, C. C. Wiffin, and E. A. McClay will be on hand to answer questions.

Gorman-Rupp Co.'s new line of cen-

trifugal self-priming contractors' pumps will be shown publicly for the first time at the Road Show. It includes pumps from the 7M 2-inch to the 125M 8-inch, and features high-speed priming at all suction lifts. Mountings available include base, wheelbarrow, pneumatic-tire, steel-wheel, and trailer. Booth 3021 will house the display.

The General Excavator Co. (See The Osgood Co.).

George Haiss Mfg. Co., Division of Pettibone Mulliken Corp., will have Booth 2618, where it will show its new Model 482 trough conveyor, new sectional conveyors, the new Model 483 belt-type car unloader, and the new Model 484 drag-type car unloader.

The Haiss Model 80 heavy-duty loader will also be on display. Sales Manager of Conveyors W. E. Madden will be in attendance.

Hall-Scott Motor Division of A. C. F. Brill Motors Co. will exhibit two new engines at Booth 3827. One is the model 400 6-cylinder truck engine, and the other is the Model 2269-0 12-cylinder industrial engine. Visitors will find W. C. Humphreys, F. Cushing, and J. H. Webb at the booth.

The Hanson Clutch & Machinery Co. will exhibit for the first time its Model 41 1/2-cubic-yard shovel, as well as the Hanson yard and dock crane. F. A. Junkins will be in attendance at Booth 3824; Export Representative H. A.

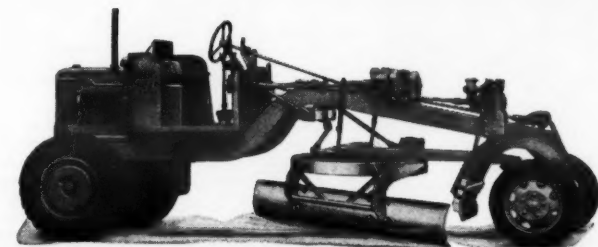
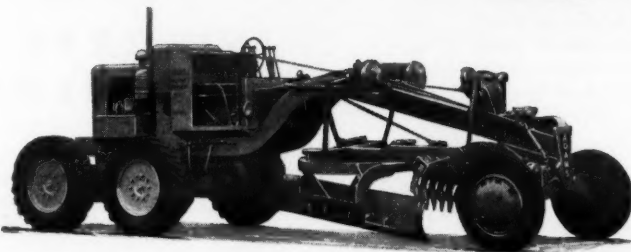
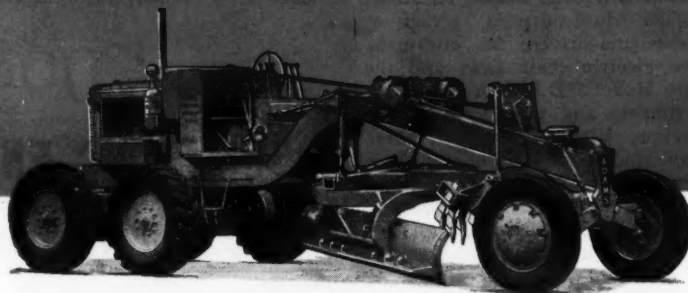
Sillcox will also be on hand.

Harnischfeger Corp. will demonstrate its newest equipment in action at Booth No. 2202. Included will be a P&H Model 150 1/2-yard shovel equipped with dual controls so visitors can operate it; a Model 255-A equipped as a trench hoe; a Model 255-A truck crane with an extra-long boom; and largest of the P&H shovels—a Model 855-B 2-yard machine. A P&H single-pass soil stabilizer will be there, with the rear processing chamber raised and powered by an electric motor so visitors can see how the unit operates. A model of the Mag-neturque unit used on the P&H 1055 shovel will be displayed, along with a P&H planetary transmission, diesel en-

(Continued on next page)

See Them At The Road Show!

Chicago, Soldier Field, July 16 to 24



ADAMS

The World's Most
Complete Line of
Motor Graders

Machines Illustrated From Top To Bottom

- No. 610—New Heavy-Duty Model—100 H.P. Diesel Engine.
- No. 512—Standard Heavy-Duty Model—76 H.P. Diesel Engine.
- No. 414—(Not shown) Lighter machine, same engine.
- No. 312—A Medium-Duty Machine with 50 H.P. Diesel Engine.
- No. 305—(Not shown) Same machine, 50 H.P. Gas Engine.
- No. 201—Smaller, General-Utility Model—31 H.P. Gas Engine.

Adams offers six motor graders, ranging from 31 H.P. to 100 H.P. There's an Adams Motor Grader to meet your needs exactly. If you can't attend the Road Show, ask your local Adams dealer for full particulars . . . J. D. Adams Manufacturing Co., Indianapolis, Indiana.

Adams

MOTOR GRADERS • LEAVING WHEEL GRADERS • ELEVATING GRADERS



Homelite will demonstrate its new electric paving breaker at the Road Show. It is powered by a Homelite dual-purpose high-cycle generator.

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

gines, and gasoline-engine-operated portable arc welders—Models WN-200 and WN-300. A full staff of factory men will be on hand.

The Heil Co. will have Booth 3110 at the east entrance to the South Concourse. Exhibit feature will be the Heiliner, the 2-wheel rubber-tired diesel-powered tractor and 16-ton 2-wheel scraper combination. Another Heiliner unit will be shown with the 28-ton Heil bottom-dump wagon. A complete range of Heil bulldozers and Trailbuilders will be demonstrated, including blades 9 feet wide up to 14-footers. Open-top 4-wheel Heil scrapers will be exhibited, along with front and rear-mounted power-control units, and Heil dump bodies and Twin-Arm hoists. Among those in attendance at the Heil exhibit will be Julius P. Heil, Joseph F. Heil, W. E. Simons, Dan Pierce, Mike Carlson, Ted Miller, Harlan Stoller, Herman Wagen, John Barclay, Charles Allis, Len Anderson, and others.

The Heltzel Steel Form & Iron Co. will occupy Booths 1026-1227. It will exhibit a new type of poured joint material called Enamelite which is cold-applied and machine-installed in plastic concrete. It will also show the 21 to 25-inch dual-duty form designed for pouring the VVHB slab at Patterson Field, Ohio, in 1947. The form has a special dowsing arrangement, since specifications called for eight 3-inch dowels per 12-foot form section, and stipulated that the form alone could

support the dowels in position during pouring operations. Heltzel will also show its heavy-duty 1/4-inch steel road forms for highway projects; its steel curb and gutter forms in battered, non-battered, rigid-radius, and flexible types; its dual weigh batchers; its concrete buckets; and the Flex-Plane automatic spray machine for applying membrane curing compounds to concrete pavements.

Henry Mfg. Co., Inc., will present to Road Show visitors its hydraulic bulldozers, and Henry 2-wheel hydraulic scrapers. It will occupy Booth 4309, where Albert Henry, Sr., Bernhard W. Nelson, Albert Henry, Jr., Alvin W. Acker, and Dale H. Page will be in attendance.

Hercules Steel Products Corp. will feature at Booth 3013 its recently announced Aircrater, a dump body designed especially for hauling air-entrained concrete. In addition to the Aircrater, Hercules plans to exhibit several models from its line of hydraulic hoists and dump bodies. R. J. Nymberg, Jack C. Gay, Leo M. Brown, and Robert R. Sheffer will be at the booth.

Hetherington & Berner, Inc., will exhibit the H & B Moto-Paver at Booth 3808. The unit is designed to do the complete mixing and paving job in one continuous operation.

Highway Equipment Co., Inc., will show its material or aggregate spreaders and its sand and cinder spreaders at Booth 3223, where H. A. Wendler, F. R. Carns, and M. J. Kroupa will be in attendance.

Homelite Corp. will conduct working demonstrations of its equipment at Booth 2112. It will exhibit for the first time its new electric paving breaker for small demolition and repair jobs. It will also show its Model 24S3 3-inch self-priming pump in operation at various suction and discharge heads; its Model 24A230/180 dual-purpose generator, gasoline-engine-driven; its one-man-operated electric chain saw; and the Homelite Model 23B blower for ventilating tunnels and pipe lines during construction. Visitors will find these company officials at the booth: Vice President Nelson Thompson, Assistant Sales Manager Kenneth J. Clapp, Advertising Manager J. H. Maxwell, Jr., and sales managers from Homelite's 15 district offices.

The Frank G. Hough Co. will exhibit, in Booths 2204-2403 the new Model HM Payloader, a tractor shovel featuring all-wheel drive and having 1 1/2-cubic-yard bucket capacity, and the new

Hough Pick-Up Street Sweeper. Included in the exhibit also will be Pay-loaders of 10 1/2-cubic-foot, 3/4-cubic-yard, and 1 1/4-cubic-yard capacity; Hough bulldozer-shovels for International crawler tractors; tractor loaders and tractor sweepers for International and Case wheel tractors; and Hough-Universal road sweepers.

Hyatt Bearings Division of General Motors Corp. will set up its display at Booth 1025. It will show its Hy-Load bearings in separable or non-separable types; its Industrial Inch series of bearings designed for slow-moving heavily loaded machinery where large-diameter shafts are the rule; the Hyatt Spher-

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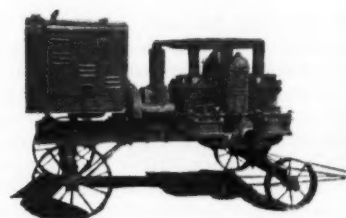
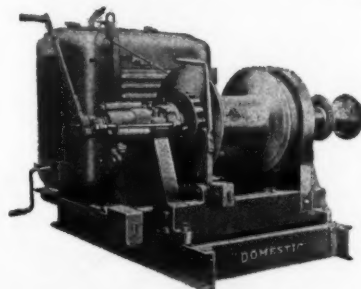
For over 44 years DOMESTIC pumps and hoists have been saving money for the construction industry. The complete line provides equipment of the right type and capacity for every construction project. Write for a folder showing how DOMESTIC hoists and pumps can save you money on your next job.

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3" and 4" Open and Closed
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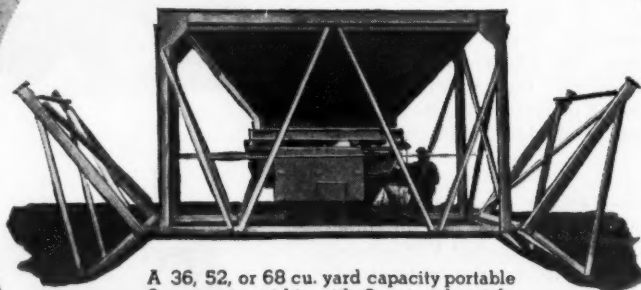
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Now, large volume bituminous mixing is accomplished at costs never believed possible. New ideas, new principles of design permit new methods for high speed mixing. Low original investment with correspondingly low power and operating costs are features of this McConaughay Mixer.

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angular bearing, an angular-contact self-aligning bearing designed to sustain both radial and thrust loads; the Hyatt line of wound roller bearings with solid and split races; and the 90,000 Series solid roller bearings available as roller assemblies only, or with solid or split outer races. H. K. Porter, J. R. Gilmartin, H. M. Carroll, C. L. Newby, J. M. Kelly, W. L. Iliff, L. C. Fisk, R. W. Frazer, L. L. Hill, T. E. Hustead, J. L. Haynes, F. H. Webster, and T. A. Russell will be at the booth.

Hydraulic Equipment Co. will feature an all-plastic working model of a hydraulic system, at Booth 1836. Colored oil will show the course of the hydraulic fluid. The company will give its first public showing of a new line of combination units. Capacity of these new small Hydreco P.V.T. (pump, valve, and tank) units ranges from 1/2 to 4.5 gpm. The company will also introduce at the show, as a separate unit, the new small 100 Series pump which is used on the above combinations. Cutaway models of pumps and valves will be displayed—among them, the new Hydreco VB Series control valve for bulldozers and front-end loaders.

Hyster Co. will feature the Hystaway dragline, clamshell, and crane combination unit for use with Caterpillar track-type tractors and bulldozers. Among the other equipment pieces it will exhibit at Booth 3208-3805 will be the complete Hyster line of double-drum winches and towing winches.

Ingersoll-Rand Co. will set up its exhibit of rock drills, compressors, air and electric tools, and centrifugal pumps at Booth 3108. Visitors will find included in the display the self-propelled rock drill for quarry work, the Quarrymaster; the Wagonjack designed to combine the stability of a wagon drill with the portability of a jackhammer; the J-10 Jackhammer for general utility and the J-30 Jackhammer for drilling medium to hard rock; the Carset Jackbit which has cutting edges of carbide; the stud-type Jackbit and Jackstud attachment; the I-R electric rotary impact tool; the PB-8 and the PB-6 paving breakers; the Airlite air-powered generator which operates two 75-watt 115-volt bulbs; the KA-Series Mobil-Air portable compressors, and the new utility Pac-Air portable compressor recently added to the line.

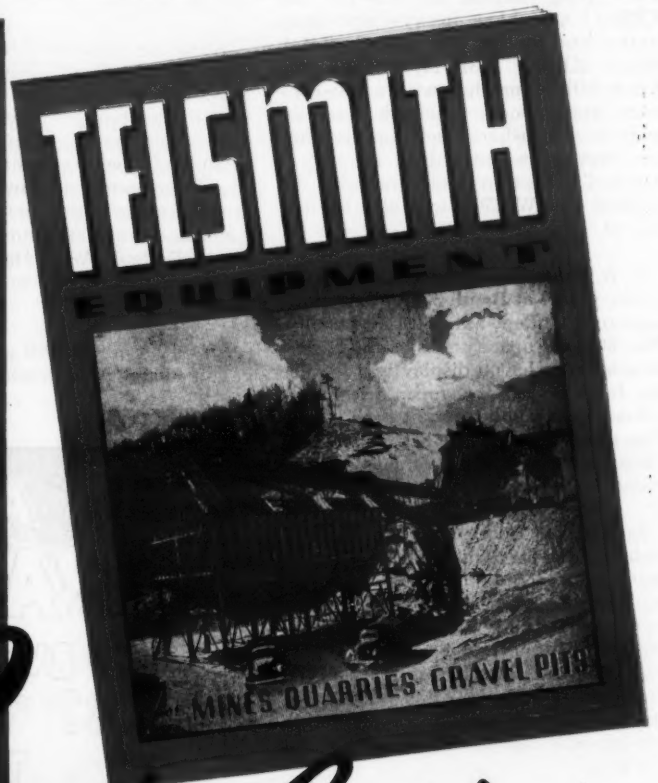
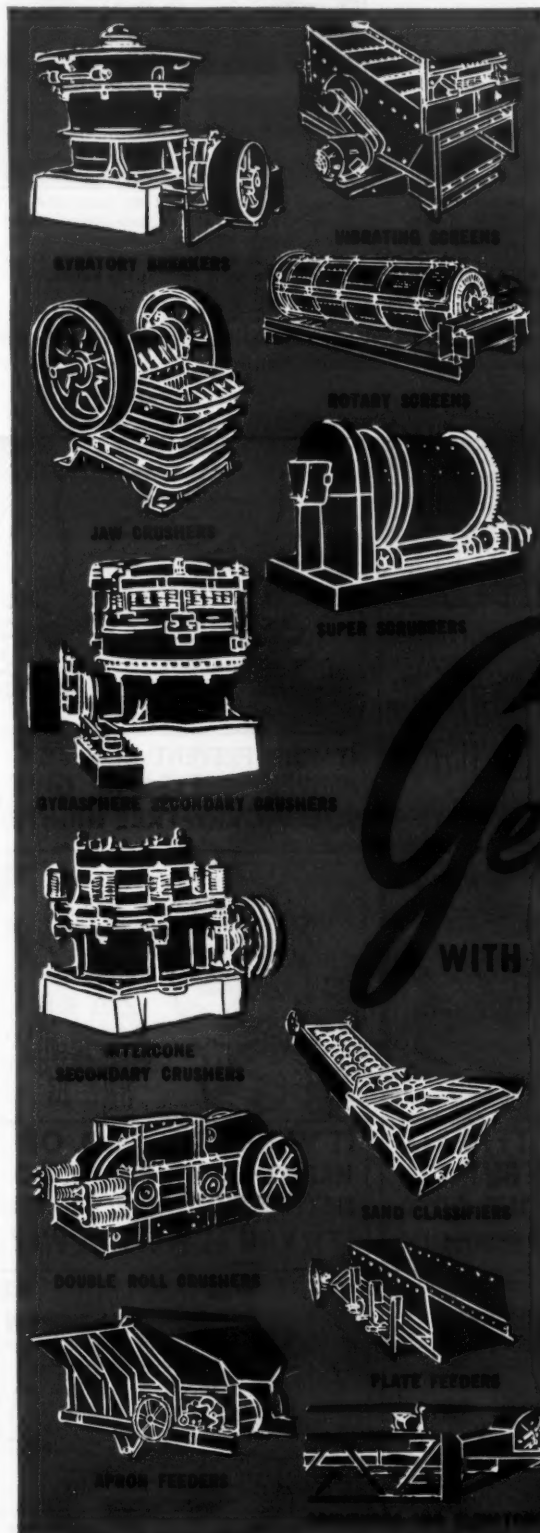
Insley Mfg. Corp. will occupy Booth 3031 and will exhibit a 1/2-cubic-yard lorry crane, dragline, and hoe. W. B. Elliott, Fred B. Ray, James R. Elliott, and D. H. McNaughton will be in attendance at the booth.

International Harvester Co. exhibits will take up 80,000 square feet at the Show, at Booths 2207-2407-2503. All International tractors will be shown with matched equipment for specific types of work. Diesel crawler tractors will include the TD-24, TD-18, TD-14, and TD-9 with dozers, scrapers, rippers, snow plows, etc. Carburetor-type crawler tractors, the T-6 and T-9, will be shown with Isaacson angling bull-

dozers, Hough bulldozer shovels, and Maine Steel overhead loaders. Dozers, scrapers, rollers, and loaders will be matched with the diesel wheel tractors, the ID-9 and ID-6, and with the carburetor-type wheel tractors, the I-9, I-6, and I-4. Mowers, snow plows, sweepers, and loaders will be matched with the Super A and International Cub

tractors. International power units in the exhibit will include the carburetor-type U-2, U-4, U-6, and U-9, ranging from 22 to 55 hp; and the diesel UD-6, UD-9, UD-14A, UD-16, UD-18A, and UD-24, ranging from 39 to 180 hp. The International Motor Truck Division will display the KB-1 pick-up with 2-way radio; the KB-3 pick-up; KB-5 in three

combinations—with mounted shovel, with stake body and road worker, and with a dozer loader operated from a power take-off. The KB-6 all-wheel-drive truck will be teamed with a scraper-plow; the KB-6F six-wheeler will have a platform body, winch, rolling tail pipe, and gin poles; the KB-7 (Continued on next page)



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E-10

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Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

will have a 3-way dump body and hoist; the KB-8 will have a dump body and hoist; the KB-8F will have a telescopic-arm excavating and grading machine. The KB-10 and KB-11 will be teamed with tilting trailers; the KB-11F and KBR-14 will have heavy-duty dump bodies and hoists. The KB-8, KB-1, KB-5, KB-10, KBR-14, KB-10, and KB-6 will be matched with a wet-concrete dump body, mechanic's service body, rock crusher, black-top distributor, snow plow, core drill, etc. International's western truck models, the W-4042 and W-6564, will also be displayed.

C. R. Jahn Co. will display its latest trailer model at Booth 3230—the 8-ton-capacity tandem-axle tilting trailer. The 30-ton-capacity heavy-duty tandem-axle trailer on display will feature the Jahn brake mechanism with individual brake application at each wheel. The third unit shown will be a Jahn converter dolly used to convert a semi-trailer to a full trailer.

Jaz, Inc., at Booth 3225, will show its mobile service station—Kilroy—designed to provide complete one-stop service to heavy construction equipment in the field. The machine is a recent invention and has never before been shown outside of Pittsburgh. President John H. Adler, Treasurer Daniel Cercone, and Secretary Ralph Paolina will represent the company at the booth.

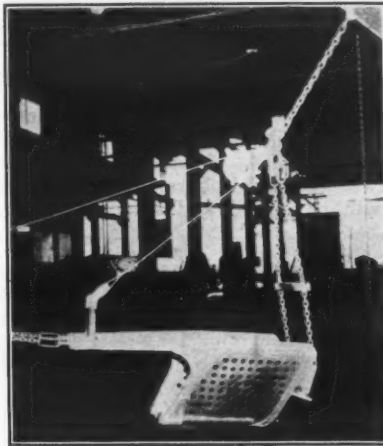
C. S. Johnson Co., Koehring Subsidiary, will exhibit for the first time, at Booth 3010, a new elevating charger for unloading cement from box or hopper-bottom cars; an all-purpose welded 3-compartment aggregate bin in 50, 75, and 120-cubic-yard capacities for use with one multiple-material batcher, or in capacities of 55, 80, and 125 cubic yards for use with two multiple-material batchers. The Lo-Bin trolley batcher will also be shown for the first time. Its bin capacity with extension panels in place is 30 tons; hopper capacity is 22 cubic feet. The bin legs are adjustable so that the bin and batcher can be lowered 9 inches or raised 18 inches from the regular 9½-foot height. Johnson will also exhibit its Little Titan platform scale, its clamshell buckets in sizes from ¾ to 2½ cubic yards, and its concrete buckets in sizes from ½ to 4 cubic yards. Company representatives at the booth will include E. O. Martinson, A. K. Downs, Harold Buckler, and Ray Russell.

Joy Mfg. Co., Sullivan Division, will occupy Booth 3001, where six of the eight sizes of its WK-80 portables will be shown. Compressors range in size from the small 60-cfm to the 630-cfm model. It will also exhibit the heavy-duty WN-102 semi-portable model in slow motion; visitors will watch it work through heavy transparent lucite plates. The Unitair stationary air compressors will be shown and operated; also tunnel-driving rock bits, drifter drills, and the Hydro-Drill-Jib jumbo mounting, and

the Joy Model HL-20 shovel-type loader. Joy's single-drum hoists and winches; its Silver Streak cadmium-plated rock drills, paving breakers, backfill tampers, trench diggers, spaders, and other pneumatic tools; and the one-man wagon drill, as well as the Joy medium-weight wagon drill, will be on display. The company's complete line of parts and accessories will round out the display.

Keystone Asphalt Products Co. will introduce in Booth 1846 at the Road Show its Kapco board as base plate under road joints. It will also exhibit Kapco joint-sealing compounds, its asphalt and fiber expansion joints, cork expansion joints, dummy joints, mastic board, tongue and groove joint, and its concrete-curing compounds. T. R. Johnson, J. E. Poole, W. E. Hagemeister, and R. H. Larson will be in charge of the booth.

Kinney Mfg. Co. will exhibit a 1,000-gallon Model A bituminous distributor



Yaun's new all-welded ditching bucket, to be featured at the company's Road Show booth, digs a sloping ditch for irrigation or drainage. Sizes range from 7 cubic feet to 3 cubic yards.

mounted on a Model EH Mack truck. The distributor features a Cartwright type of circulating spray bar with a new

improved piping scheme to eliminate cold spots in the lines. The following company representatives will explain this feature to Road Show visitors at Booth 2104: Chicago Manager A. J. Munday, Philadelphia Manager H. G. Saunders, Vice President in Charge of Sales W. E. Worcester, and W. B. Mills, W. T. Chester, and Theodore E. Burleigh, Jr.

The Knickerbocker Co., at Booth 3852, will display its Nos. 3½-TS, 6-SE, and 11-SE concrete mixers. W. B. Knickerbocker, S. L. Walker, and J. V. La Vanway will show visitors around

Koehring Co. will occupy Booths 1828-3010 with its subsidiaries C. S. Johnson, Kwik-Mix, and Parsons. It will initiate a new 2½-yard excavator at the Show, a 12-yard hauling unit, a smaller paver, and a new Longitudinal Finisher with a hydraulically operated screed lift. Other Koehring machines on display—½ - yard, ¾ - yard, 1½ - yard (Continued on next page)

**NOT A
MIRACLE
— BUT THE
NEXT THING
TO IT!**

IT WON'T PREVENT FIVE-O-CLOCK SHADOW BUT IT WILL SHAVE YOUR OPERATING COSTS TO MINIMUM

**THE BUTLER AUTO-BATCH TWINBIN
KEEPS UP A STEADY
FLOW OF CEMENT!**

**THE BUTLER AUTO-BATCH
TWINBIN
SUPPLIES
TWO BATCHES
AT A TIME!**

**EASILY KEEPS PACE
WITH A
DUAL DRUM PAVER**

IT WON'T PREVENT COFFEE-NERVES - BUT IT WILL GIVE YOU WORRY-FREE NIGHTS!

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HEY! WHERE CAN I SEE IT?

IT WON'T STOP MUSCULAR PAIN - BUT IT WILL SAVE YOU A LOT OF TIME, - LABOR AND HEADACHES

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**BUTLER BIN COMPANY'S
GREAT SOLUTION TO THE
BATCHING PLANT PROBLEM**

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BARRELS
YET THE BUTLER
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TWINBIN
IS THE WORLD'S
MOST PORTABLE**

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ROAD SHOW
EXHIBIT
SPACE 3015!
DON'T MISS IT!**

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MOUNTED ON WHEELBARROW CHASSIS**

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ROETH VIBRATOR CO.
1737 Farragut Ave.
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Ill.

excavators; 34-E Twinbatch pavers; Dumpsters; and Mud-Jacks—will embody post-war changes and improvements not previously shown.

Kwik-Mix Co. will exhibit its bituminous mixers, plaster mortar mixer, and 3½-S to 16-S concrete mixers, including a new-type non-tilting 3½-S Dandie mixer. It will also show its power wheelbarrow at Booths 1828-3010, along with its parent company, Koehring.

Le Roi Co. plans to introduce its new Model H540 V-type 8-cylinder engine at Booth SC-3102. The unit provides speeds up to 1,800 rpm and horsepower ranging from 50 to 125. It will also exhibit there, for the first time, some new front-end equipment for the Tractair—a mobile air-feed sinker drill called Trac-Jac for Mud-Jack work or other shallow-hole drilling. Visitors to the Le Roi exhibit will find there, also, eight sizes of the Airmaster line of compressors in various mountings; and the Tractair tractor-compressor unit with its interchangeable front-end equipment shown in operation—a winch, plow, backfill blade, rotary broom, front-end loader, etc. The Le Roi-Centaur mower for mechanized weed control will be on hand, along with the complete line of Le Roi-Cleveland contractors' tools: paving breakers, rock drills, diggers, tampers, wagon drills, and accessories. Some Le Roi rock-drill developments will also be demonstrated. And rounding out the exhibit there will be a cutaway operating model of the D140 engine, a 10-kw ac generator set, and a complete service parts display. R. M. Darr, J. E. Heuser, J. M. Dolan, and J. G. Dean will be in attendance at the booth along with several company district managers.

A. Leschen & Sons Rope Co., at Booth 1234, will show the public its Hercules flat-laced wire-rope slings. It will also display samples of Hercules Red-Strand wire rope in various types as required in the highway-construction industry. M. R. Arnold, E. J. Schillinger, Clark Browne, W. C. Richards, Arnold Walters, and H. L. Waltman will be in attendance.

Lima Shovel & Crane Division, Lima-Hamilton Corp., will have Booths 3811-3202-A in the South Concourse, where it will exhibit a shovel and a dragline. Visitors will be able to make a thorough inspection of the machines' features. In attendance from the Lima home office will be the following: Vice President Henry Barnhart, General Sales Manager Paul R. Ehrigott, Advertising Manager Roy Wills, Assistant to General Sales Manager J. W. Hardesty, Vice President in Charge of Engineering A. J. Townsend, Mechanical Engineer William Huston, Parts and Service Manager J. W. Artz, Assistant Director of Foreign Operations J. R. Gregson, Assistant Secretary-Treasurer O. J. Greiwe, and Assistant to the President M. K. Tate. District Managers will also be there.

Littleford Bros., Inc., will announce several new equipment models at the Road Show, Booths 3016-3209: The Spray King Model M pressure distributor, a new Vari-Packer roller, a Tankar super heater, and Model 66-R Kwik-Melter kettle. It will also exhibit a Spray Master Model CLRC pressure distributor, No. 101 utility spray tank, 93-OB emulsion sprayer, a Trail-O-Roller, a No. 108 road broom, a Tankar steam heater, a HanDeeBox tool box, an 84-HD kettle, etc. Following will be hosts at the booth: L. W. Glaser, H. Haupt, R. G. Hext, D. Carter, S. Brent, R. S. Arthur, C. C. Chopp, and W. Schulie.

The Lufkin Rule Co. will display almost all the products it makes at its



Pioneer's new low-cost Continuo gravel plant, to be shown for the first time at the Road Show, consists of a Buzzer screen attached to the end of a 40 or 50-foot Super-Service conveyor—all mounted on a hydraulic cradle-type truck for portability.

Road Show booth, No. 1031 in Exhibition Hall. Featured will be its tapes and rules for engineers. E. H. Meibeyer, R. M. Benjamin, R. T. Lone, W. J. Stewart, and T. P. Young will be present.

Lull Mfg. Co. will set up its display of loaders at Booths 3020-3213. Visitors will find models of the Shovel loader

there, with interchangeable attachments including snow buckets, concrete buckets, bulldozers, and lifting cranes. They will also find models of the Challenger loader for loose-material handling. Lull's Tilting Tower loader will be exhibited, too, along with the combination street flusher, sprinkler, and fire-fighter trailer unit. Company representatives

at the booth will include L. H. Lull, H. M. Conklin, C. M. Strauch, I. K. Nelson, C. H. Swedlund, R. S. Anderson, P. V. Schermerhorn, and C. H. Sheldon.

Mack-International Motor Truck Corp. will star a pedigreed English Bull pup at its Booth, No. 3003. "Mack", as he is named, will greet all visitors enthusiastically, since one of them will ultimately be his owner. The company will conduct a contest to estimate the number of turns made by the tailshaft of a big transmission. "Mack" will go to the person guessing nearest to the exact number turned by the close of the contest. In addition to "Mack", the exhibit will feature a new Model LV 22½-ton-payload-capacity end-dump truck which has a 275-hp super-charged diesel engine. The company will also show a medium-size dump truck, the Model EQX, rated at 25,000 pounds gross-vehicle-weight; the stripped chassis of the Model LJSW, a 4-wheel-drive six-wheeler; and the 4-wheel-

(Continued on next page)



Bottom-Dump Euclids are designed and built for the specific job of moving big loads over off-the-highway hauls at the lowest cost per ton or yard moved. Here are some of the reasons for the outstanding production and performance records of Bottom-Dump Euclids on a wide range of earth moving jobs:

SPEED AND CAPACITY . . . loaded top speeds to 31.6 m.p.h. and capacities of 13 to 24 cu. yds. struck measure or 20 to 36 ton payloads; diesel engines of 150 to 275 h.p.

EASE OF HANDLING . . . short wheel base of tractor and the universal hitch permit sharp, fast turns and provide excellent maneuverability.

QUICK, CLEAN DUMPING . . . full length and width door openings and smooth, steep hopper sides shed the load quickly for non-stop dumping.

TRACTION AND FLOTATION . . . excellent weight distribution achieved by wedge shaped hopper of trailer and the Euclid hitch design . . . a large percentage of the trailer and payload weight is carried on the drive wheels for good traction . . . large single drive and trailer tires assure excellent flotation for soft haul roads and fills.

These are just a few of the Euclid features that add up to efficient off-the-highway hauling and greater profits for owners. Your Euclid Distributor or Representative will be glad to supply complete data on all current models of Euclid earth moving equipment.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio



Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

drive Balanced Bogie. The following will attend the Show: A. F. Fenner, Vice President in Charge of the Central Division; R. J. Meinert, National Accounts Manager, Central Division; Allen McClimon, Off-Highway Representative; M. C. Horine, Sales Promotion Manager; Albert Crockett; J. A. Sloan, Manager of the Chicago branch office; and R. E. Maulsby, Export Department, New York office.

Macwhyte Co., in Booth 1600, will display its preformed wire rope for shovels, cranes, draglines, scrapers, and hoists. It will also show special Atlas braided wire-rope slings for material handling with cranes. A moving display will show wire-rope stocks and locations of distributors and mill depots.

Maginniss Power Tool Co. will exhibit Hi-lectric concrete vibrators, generators, concrete surfacers, portable saws, cables, and plugs at Booth 1816. There will be a working demonstration of a concrete vibrator, a concrete surfer, a portable saw, and floodlights—all operating from a Hi-lectric motor generator. A Hi-lectric gasoline generator will also be on display. H. J. Maginniss and W. R. Petersen will be in attendance at the booth.

Mall Tool Co., exhibiting at Booths 1410-2106, will feature the Model 60 saw and saw table and the 381 MallDrill with attachments that will saw, shear metal, sand, grind, wire-brush, hole-saw, drill masonry, polish, drive screws, etc. The Model 7 chain saw will be on exhibit outside, along with 1½ and 3-hp gasoline-engine power units that operate attachments for vibrating, surfacing, drilling, sanding, polishing, sump pumping, and wire-brushing.

Marion Power Shovel Co. will show two post-war machines at Booth 3023 in the South Concourse—the 111-M and the 33-M shovels. Walkways will enable visitors to examine them at the machinery-deck level as well as ground level. Interiors of the machines will be lighted and explanatory signs will identify working parts. The 111-M is a clutch-type diesel machine with an electric swing. The 33-M is the smallest shovel in the company line, and can be converted for use as a shovel, clamshell, pull shovel, crane, or dragline. Kodachrome movies at the exhibit will show visitors these and other Marion machines in action in the field.

Marlow Pumps will exhibit its self-priming centrifugal pumps and the Mud Hog diaphragm pump at Booth 1612. Visitors will find, in attendance at the booth, A. S. Marlow, Jr., P. E. Atkinson, R. S. Rubin, Jr., J. Jordan, and C. Lupton.

Marmon-Herrington Co., Inc., will exhibit its all-wheel drive unit on a Ford Model F-7 truck. H. L. Fisher and F. M. Myers will show visitors around the exhibit in Booth 3221.

Meili-Blumberg Corp. plans to display its power graders, maintainers, implement and equipment trailers, and street and highway safety-line markers at Booth 3228. J. F. Sims, Paul Blum-

berg, N. C. Petersen, and J. F. Weir will be in attendance.

Michigan Power Shovel Co. will exhibit at Booth 2608. Five models representing Michigan's line of truck shovel-cranes, and including the latest post-war developments, will feature front-end equipment most common to each model. Company officials, branch managers, and members of the Michigan service organization will be on hand.

The Miller Spreader Corp. has been assigned Booth 4502 for its exhibit of the Miller bituminous-concrete and aggregate spreader, with accessories. F. E. "Pop" Miller, William J. Miller, and W. C. Moore will greet booth visitors.

Minneapolis-Moline Power Implement Co., occupying Booth 3210 on the South Concourse, will exhibit its 49-hp Model UTI wheel tractor and its 27-hp Model RTI wheel tractor. Equipment attached to these tractors will include loaders, scrapers, dozers, mowers, plows,

(Continued on next page)

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We'll be there ready for your questions; all set for you to look us over. We'll be in operation—running with the wheels going 'round so you can see MultiFoote simplicity, Adnun Screed action and the unusual mixing action of the Kinetic Asphalt Mixer. We will all be there, the big Duomix (Double Drum) 34-E Concrete Paver, the MultiFoote Single Drum 34-E Paver, The Adnun Black Top Paver and the Foote Kinetic Asphalt Mixer.

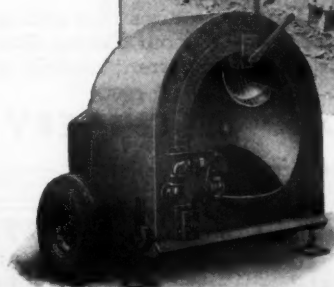
Look us over July 16-24 at Soldier Field, Chicago, Booth 3106, South Concourse. We invite you to make Our Booth Your Headquarters.

THE FOOTE COMPANY, INC.

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Also see
page 87



FOOTE

MULTIFOOTE CONCRETE PAVERS
ADNUN BLACK TOP PAVERS
Kinetic ASPHALT MIXERS

Thousands of European children are
hungry. Help them by contributing
to the U. N. Appeal for children.

winch, etc. Included in the display will be the MM1210-12A power unit, the HUA-403-4A, and the 206A-4A. Personnel in charge of the exhibit will be B. D. Grussing, Advertising Manager; Robert Hall, Advertising Department; E. A. Henry, Industrial Sales Manager; and E. R. Raveling, in Charge of Sales to Manufacturers.

Mixermobile Manufacturers, in Booth 3809, South Concourse, will exhibit a Mixermobile, a portable concrete and elevating plant; the Wagner Towermobile, a truck-mounted hoisting tower; the Wagner Scoopmobile, a tricycle type of loader on pneumatic tires; and the Wagnermobile Foldaway Lift, a hydraulic lift truck designed to get in and out of tight places. The company will also exhibit the new Duo-Way Lift, a lumber lift of 16,000-pound capacity, and the Wagner Scraper-Dozer, an entirely new self-loading earth mover of 15-yard capacity with dozer attachment. James J. Foreman, S. C. Herrick and J. Burke Long will be in charge.

Morse Chain Co. will have Booth 1415 and will display silent-chain drives, roller-chain drives, flexible couplings, friction clutches, and over-running clutches. New products exhibited will include new silent chains and sprockets manufactured to the new silent-chain industry standards to permit interchangeability of chains and sprockets of various manufacturers. New Morse-Rockford small-diameter friction clutches in capacities ranging from 1/2 to 1.7 hp per 100 rpm will be shown; also a new line of Morse-Formsprag over-running clutches for indexing, free-wheeling, and back-stopping applications. The exhibit will feature product animations and a large silent-chain "rocker" joint in continuous operation, along with construction breakdowns and cutaways of roller chains and Morflex couplings. Morse representatives at the Show will include President F. M. Hawley, General Sales Manager R. J. Howison, Manager of Morse-Rockford Sales Division D. C. McNeely, Manager of Morse-Formsprag Sales Department H. R. Greenley, Advertising Manager I. A. Horton, and field men from Morse sales office.

Motorola, Inc., has a new FM Handie-Talkie portable radiotelephone which it will exhibit at Booth SC-3101, along with its FM two-way radiotelephone equipment. Sales Manager Eugene S. Goebel will be at the booth, with Regional Managers Homer Marrs and Glenn Munro and field engineers Ray Baumgart, Frank Walker, Joe Hogan, Tom Brown, Vernon Anderson, and Bob Boytet.

Municipal Supply Co., at Booth 3814, will show its Gutter-Snipe pick-up street sweeper. D. O. Paulson, C. F. Greenburg, H. E. Paulson, K. J. Parker, and J. A. Paulson will greet visitors.

Murphy Diesel Co. will have Booth 1019, where Vice President Paul Schnetzky will be in charge of the ex-

hibit of diesel generator sets and industrial engines, with engine cutaways and photos of installations on display.

N. P. Nelson Iron Works, Inc., will

show a Model P-10 heavy-duty bucket loader at Booth 3226, with A. A. Nelson and J. L. Nelson on hand.

New Holland Mfg. Co. will set up at

Booth 3238 its two-unit portable crushing, screening, and blending plant built around the No. 3030 Double Impeller Breaker. It will also exhibit the New (Continued on next page)

Rodgers PRESSES





HYDRAULICS
Rodgers
KEEP THE WORLD MOVING

Custom Built ... yet versatile in use

Rodgers
UTILITY SHIPYARD PRESS
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An outstanding press to solve a particular problem.

Rodgers
300 TON
FORCING PRESS
Ideal for wheel, sprocket or gear forcing ... for 1001 pressing, straightening or bending operations ... available in 100 to 600 ton capacity.

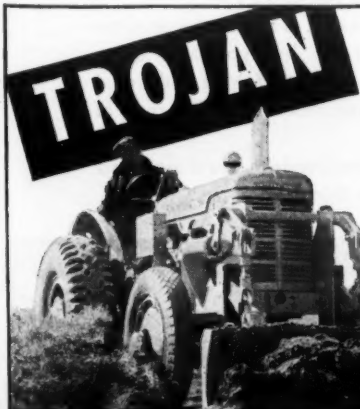
Rodgers HYDRAULIC SHOP PRESS ...
For the many miscellaneous jobs. Standard presses are available in 60, 100, 150 and 200 ton sizes. Special 300 and 400 ton presses made to order.




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Hydraulic Power Equipment

Shop Presses Crawler-Track Presses 7415 WALKER ST., ST. LOUIS PARK MINNEAPOLIS 16, MINNESOTA Portable Presses Power Pump Units



Gets on the Job Fast . . . Cleans it up Fast ANGLEDZOZER

• Here's one of the handiest pieces of equipment you ever saw. It is a bulldozer *plus*. Besides the regular bulldozing position, it can be quickly and easily adjusted for six other angles. You always have exactly the right angle to do a particular job faster and better. And, Trojan's patented parallel lift mechanism always holds the blade steady—no flopping around. Mount a Trojan Angledozer on your Industrial Wheels. Make them do double duty. Easy to mount . . . easy to operate . . . low in costs. Let your International dealer give you all the angles on the ANGLEDZOZER, or write to Department CE-83

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Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

Holland Road Stabilizer. F. W. Rollins and V. R. Despard, Jr., will be in charge.

Northfield Iron Co. will exhibit two models of its Husky road graders—Nos. 22 and 33—with a trailer drag shouldering attachment. The Northfield booth, No. 1852, will be attended by President and General Manager C. L. Brown, and by Sales Managers C. Eddie Erickson, C. E. Slater, and George Purnell.

Novo Engine Co. plans to exhibit its engines, pumps, electric plants, traffic-line markers, and portable service station. James F. Chapman and Donald M. Houghtaling will be at Booth 1605.

The Osgood Co. and The General Excavator Co. invite Road Show visitors to Booth 1413 in the Exhibition Hall for information and literature on their line of power shovels, cranes, draglines, clamshells, hoes, etc. The Osgood Air-Cushion clutch, the General Model 105 Mobilcrane, the General Model 310 crawler machine, and the Osgood Model 1000 air-controlled power shovel will be featured in this literature. George Day and L. O. McLean, Sales Managers of Osgood and General, will attend.

Oshkosh Motor Truck, Inc., will show for the first time its Model W-2205 and its Model W-703 4-wheel-drive trucks. J. P. Mosling and J. Roland Settle will have charge of Booth 3832.

Ottawa Steel Products, Inc., plans to

exhibit its heavy-duty industrial loader mounted on an International Harvester I-9 tractor; its lightweight loader mounted on an I-H Super A tractor; its heavy-duty loader, mounted on a Minneapolis-Moline Model UTI and equipped with a hydraulic system which will also operate a Henry Mfg. Co. Model G-1 scraper; and its regular loader, mounted on a Minneapolis-Moline Model RTI tractor and equipped with a Henry Mfg. Co. Model G-1 scraper. E. L. Johnson, J. F. Laughhead, and E. J. Titus will be in Booth 3210.

Pacific Car & Foundry Co. will introduce its new Model S winch for small crawler and wheel tractors, in a cut-away model. The display will also include cutaways of the Model G winch and the Model L power-control unit, and working models of the Hydradozer and Cabledozer. The company's E and J winches, the R double-drum hoist, and tractor canopies will be exhibited. Carco tractor equipment will also be shown at the Allis-Chalmers, International Harvester, and Oliver Corp. exhibits. Ferdinand Schmitz, Jr., Thor Hendrickson, Bob Sinclair, A. W. Rhodes, Mike Conway, Hilton Lysons, George Carr, Wayne Lindgrin, Frank Moline, and Byron Walker will be in attendance at Booths 3204, 2407, 3604.

Page Engineering Co. will have Booth 3826, where the feature display will be an exact copy of the first 2-line dragline bucket built in 1903 by John W. Page, President of the company. Beside the replica will be a modern 30-cubic-yard dragline bucket—just to point up the contrast. Also on display will be the standard Page Automatic dragline

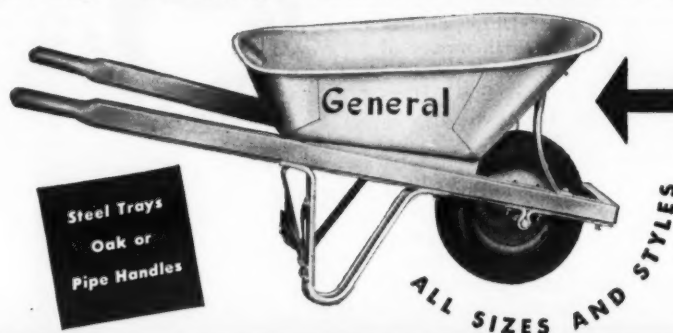
bucket of $\frac{3}{4}$ -cubic-yard size, a $\frac{1}{2}$ -yard slat bucket, and a 1-yard perforated bucket. Visitors may also inspect tooth points, chains, sockets, etc., which will be exhibited, and they will receive a new booklet entitled "How to Get the

Most Out of a Page Automatic Dragline Bucket". Robert W. Baker and W. E. Demard will attend the booth.

The Parsons Co., Koehring Subsidiary
(Continued on next page)

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prompt delivery from current production

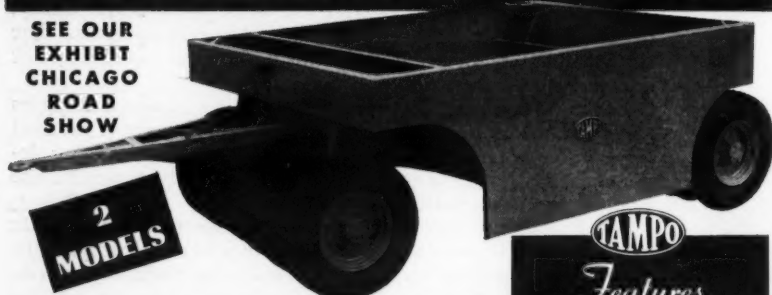


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"The Wheelbarrow with Orange Handles"

PNEUMATIC ROLLING WITHOUT GAPS

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ROAD
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ROLL 60" OR 84" PATHS ON
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- ★ 13 wheel 84"-full coverage rolling width
- ★ 9 wheel 60"-full coverage rolling width
- ★ For compacting base and surface courses
- ★ Oscillating axles assure uniform compacting and longer tire life
- ★ Ground pressure variable - depends on weight of ballast
- ★ Roller bearing (2) in each wheel

TAMPO

Features

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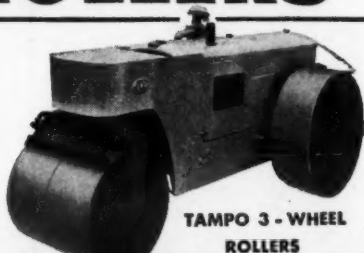
- ★ STAGGERED WHEELS
- ★ OSCILLATING AXLES
- ★ UNDERSLUNG CHASSIS

TAMPO

**PNEUMATIC TIRED
ROLLERS**



TAMPO SHEEPSFOOT
TAMPING ROLLERS

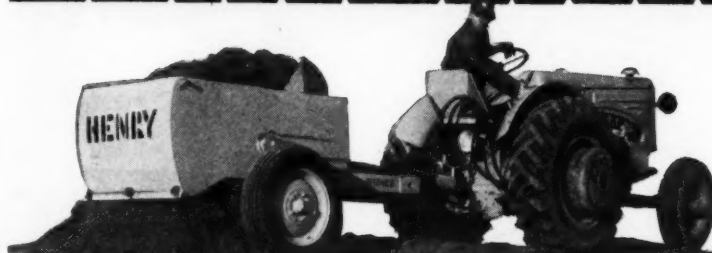


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1146 W. LAUREL - TELEPHONE P-9173 - SAN ANTONIO 6, TEXAS

MM INDUSTRIAL... Earthmovers



1-3 Yds. Per Haul • 12.6-14.5 M.P.H. Max.

High speed scraping and transport are done at low cost by the 27 H. P. RTI equipped with a 1 yd. pull behind scraper. 14.00-24 rear tires for added flotation and traction are optional equipment and give this model 12.6 M.P.H. on smooth surfaces.

For double capacity on larger jobs the 49 H. P. UTI pulls a 3 yard scraper. 18.00-26 10-ply rear tires are optional equipment that provides more flotation and a 14.5 M.P.H. road speed.

BE SURE TO ASK ABOUT...

the MM UTIL for front end loaders. This is the first reverse transmission equipment of its type and gives operators 6 reverse speeds up to 14.5 M.P.H. MM Industrial Tractors give you easiest steering offered in this type of equipment.

Plan to see MM Modern Industrial Tractors and Power Units on Display at the Road Show in Chicago.

MM
MINNEAPOLIS-MOLINE
MODERN MACHINERY

MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA

agline
W. E.
bsidi-

ary, plans to introduce its Model 80 Trenchliner to the public at the Road Show, and to exhibit, also, Models 200 and 221. E. A. Brugger, H. J. Holdsworth, and M. O. Messenger will show visitors around Booths 1828-3010.

Pioneer Engineering Works, Inc., will exhibit at Booth 3301 a complete asphalt plant in operation and a complete 2-unit crushing and screening plant. Visitors will have an opportunity to see the new features which have been built into the Continuflo hot-mix asphalt plant, and the special feed arrangements featured in the crushing and screening plants. On exhibition for the first time will be Pioneer's new low-cost Continuflo gravel plant consisting of a Buzzer screen attached to a Super-Service conveyor with a reciprocating plate feeder—all mounted on a hydraulic cradle-type truck. The Pioneer triple-roll crusher will be demonstrated. An added inducement to visitors will be the temperature of the booth, for Pioneer promises it will be cool and comforting.

Portland Cement Association will exhibit at Booth 1009, where it will demonstrate the pressure method of determining the air content of freshly mixed air-entrained concrete. The recently developed pressure type of air indicator will be shown in use. The Association will also show a colored sound motion picture on modern expressways in use and under construction. Photographs of important highways and airports will be on display.

Quick-Way Truck Shovel Co. will not have a separate display of its own but will be in a portion of the International



This is Koehring's new 2½-yard excavator, Model 1005, which it will introduce at the Show after a year's test in an Indiana stone quarry on excavator and dragline work.

Harvester Co. exhibit at Booths 2207-2407-2503. The Model E and Model J will be represented with complete attachments for shovel, dragline, crane, trench hoe, clamshell, pile driver, scoop, and backfiller.

W. A. Riddell Corp. will have Booths 3209A-3220, and will exhibit Warco motor graders and Hercules 3-wheel rollers. One of the grader models will be shown to the public for the first time. General Manager Jacque E. Jones and Sales Manager E. M. Ackerman will be at the booth, along with O. E. Kline, M. J. Bowers, L. O. McClain, and Donald R. Kerr.

Rockford Clutch Division of Borg-Warner Corp. will offer its line of clutches and power take-offs at Booth 1411. Visitors will be received by E. C. Shields, G. L. Christianson, R. A. Carlson, and A. M. Reibitz.

Rogers Iron Works Co. will show for the first time its impact-principle hammermill, along with its jaw crusher and other equipment. Chief Engineer V. H. Nixon and others will be at Booth 3840.

Rome Grader & Machinery Division of The Union Fork & Hoe Co. will exhibit the Rome motor graders at Booth 3024, with A. L. Lado, George Tolnitch, and J. S. Nicholas in attendance.

Root Spring Scraper Co. will show for the first time two new models of its truck snow plows, and will also exhibit its road maintainers which mount under the truck body. W. Dan Weeks, D. B. Shults, and Don Hyde will show visitors around Booth 4106.

Rosco Mfg. Co. will have some new products, displayed for the first time, at Booth 3007. The new Model POA RoscoOdometer measures linear distances in feet and attaches to the under-frame of any truck or car. The new

(Continued on next page)

FOR
Best
RESULTS



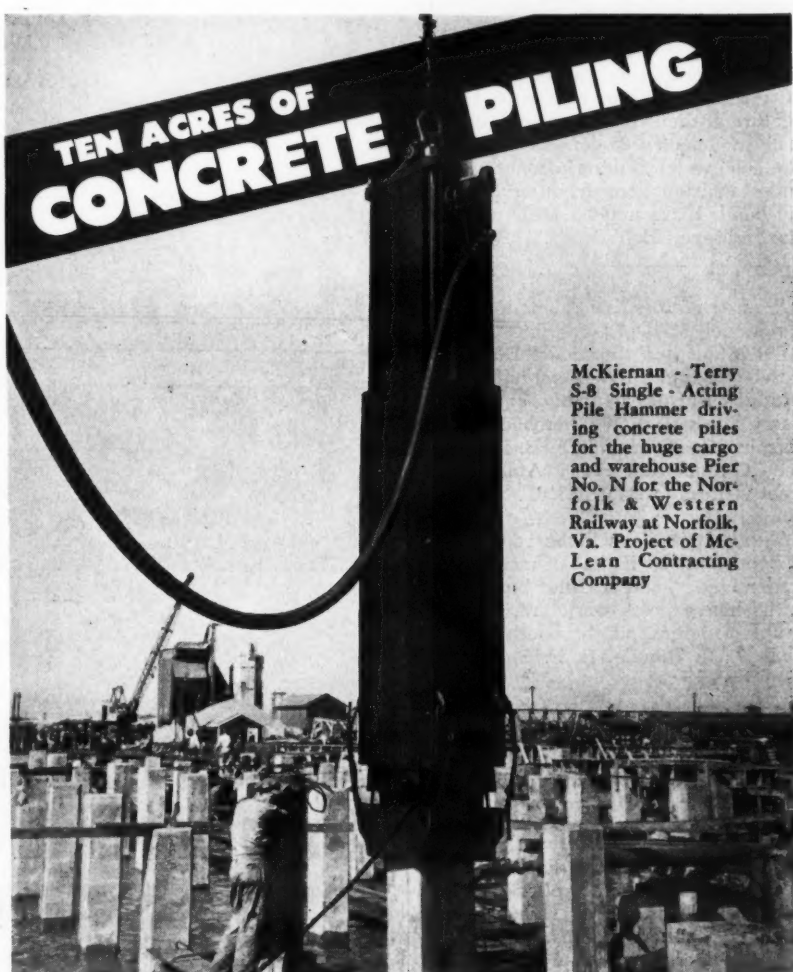
..A SUPERIOR *Swing Loader*

Where time is a factor—where the cost of equipment and labor are high—you need the money-saving advantages of this SUPERIOR *Swing-Loader*.

Less lost motion—bucket swings 90° either way, up and over the waiting truck. Mounts on International Tractors.

See your nearest International Dealer
or write to Dept. CE, at

SUPERIOR EQUIPMENT CO.
BUCYRUS, OHIO



McKiernan - Terry
S-8 Single - Acting
Pile Hammer driving
concrete piles for the
huge cargo and warehouse
Pier No. N for the Norfolk
& Western Railway at Norfolk,
Va. Project of McLean
Contracting Company

Erection of this immense pier of the Norfolk & Western Railway called for driving 5386 pre-cast concrete piles averaging 14 tons apiece. Because of the nature of the soil to be penetrated, gravity-driven McKiernan-Terry Single-Acting Pile Hammers were the contractor's wise choice.

Whatever your pile-driving problem may be, you will find a McKiernan-Terry Pile Hammer that is designed for exactly such a job. Ten standard sizes in Double-Acting Hammers; five Single-Acting Hammers and two Double-Acting Extractors are available in the McKiernan-Terry line.

FOR FULL INFORMATION

Write for illustrated descriptive bulletins No. 55 and No. 57, giving specifications, advantages, etc. You'll find them very useful to have on file.



McKiernan-Terry
CORPORATION
Manufacturing Engineers

19 PARK ROW

NEW YORK 7, N. Y.

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

Model MTA street flusher, a new Rosco street cleaner, and a new 2-wheel flusher, will also be shown. The Rosco RMT maintenance unit for bituminous highways, and the Rosco RQE distributor will round out the display. Company personnel at the booth will include President T. W. Rosholt, Vice President R. S. Rosholt, Western Sales Manager Jack D. Aldrich, and Eastern Sales Manager Harold C. Clark.

St. Paul Hydraulic Hoist Division, Gar Wood Industries, Inc., will show a cutaway of its Model 47 hoist. It will also exhibit a St. Paul Truck Patrol with hoist and dump body; a Model 47-7 and a Model 53 hoist with BR dump bodies; a Model 7 hoist and 554 dump body; a Model 95 hoist and 654 dump body; a Model 102 hoist and 673 dump body; and a Dump-it hoist and platform. Gar Wood space will include Booths 3603-3404-3403-3206.

Sauerman Bros., Inc., at Booth 1405, will display its power drag scrapers, slack-line and taut-line cableways, excavator buckets, and wire-rope blocks. Feature of the exhibit will be a working scale model of a 25-ton-capacity taut-line cableway spanning a concrete dam under construction. In attendance at the booth there will be D. D. Guilfoil, Martin Meyer, B. T. Macy, J. R. Dillon, and Louis McLouth.

Seaman Motors, Inc., plans to exhibit the Model MHD-72 gasoline-powered Pulvi-Mixer and the Model DMHD-72 diesel-powered Pulvi-Mixer, along with miscellaneous assembly equipment. Harry Seaman, A. W. Giersbach, W. D. Murphy, George Lamb, F. B. Peterson, Lacy Crolus, and Harry Aldrich will greet visitors to Booth 3816.

Shunk Mfg. Co. will be represented at Booth 1820 by its line of moldboards, grader blades, and scarifier blades, and by its heavy press work and forgings. Shunk personnel at the booth will include J. R. Randle, B. F. Smith, and Ross Swogger.

The Sisalkraft Co. will show its concrete-curing blankets at Booth 1606, with J. M. Cummings and R. S. Youngberg in attendance.

SKF Industries, Inc., will occupy Booth 1408, where it will display a complete line of spherical roller bearings widely used in power shovels, rock crushers, shaker screens, bulldozers, etc. It will also show a new line of unit pillow blocks redesigned to incorporate labyrinth instead of felt seals for excluding dirt and retaining lubricants. SKF will also exhibit split pillow blocks, including those with spherical roller bearings and designed for trunnion rollers, shaker screens, etc. SKF representatives at the booth will include R. H. DeMott, Vice President in Charge of Sales; R. R. Zisette, General Sales Manager; C. D. Cummings, Manager of Industrial Sales; E. D. Ogle, Supervisor of Automotive Sales; R. C. Byler, Advertising Manager; W. L. Aiken and J. L. Brusca, Senior Engineers; and several district and branch managers.

Smith Engineering Works plans to exhibit a scale model of a Telsmith crushing and screening plant. It will include a Telsmith roller-bearing jaw crusher as a primary breaker, an elevator, and a double-deck pulsating screen over a steel bin, arranged so that the oversize is returned to a Telsmith Gyrasphere secondary crusher. The model plant is about one-sixth the size of the real plant, which has a capacity of 500 tons a day, but it is built to crush actual rock for demonstration purposes.

D. D. Barnes, G. L. Smith, H. H. Schaper, V. H. Jones, A. Reuss, W. L. McConnell, and A. N. Wigle will show visitors around Booths 1848 and 1850.

South Bend Lathe Works will exhibit various sizes of its precision lathes, accessories, and other tools at Booth 3030. Company personnel on hand will include C. L. Miller, R. W. Planck, and P. E. George.

Spears-Wells Machinery Co. will exhibit its recently announced new-model Heater Planer for processing and maintaining bituminous-concrete pavements. H. A. Olds, I. M. Wells, and George Sievers will be in charge of Booth 3215.

Spicer Mfg. Division of Dana Corp. will have cutaway models of its heavy-duty power driving units on display at Booth 1834 so visitors can see the working parts. The units will include a 15½-inch clutch, Model 8041 main transmission, Series 1800 propeller shaft, Model 8031 auxiliary transmission, an 8031

top-mounted power take-off, a Series 1900 propeller shaft to a rear outboard bearing, four side-mounted power take-offs, and seven sets of propeller shafts and joints to connect the different units. Everett A. Brown will be in charge.

Standard Steel Works will show a new construction broom at the Road Show, Booth 3819, and will also exhibit its Model SJ maintenance distributor,


Model 424-R pressure distributor Model S tar kettle, and Model 7 street flusher. John A. Cosgrove, H. H. White, M. G. Purpus, William Swindle, and A. Hammons will be at the booth.

Sterling Motors Corp. will occupy Booth 3807. It will show a Sterling HC144 powered by a Waukesha 140GK-HP engine, mounted with a Gar Wood
(Continued on next page)

DECALS

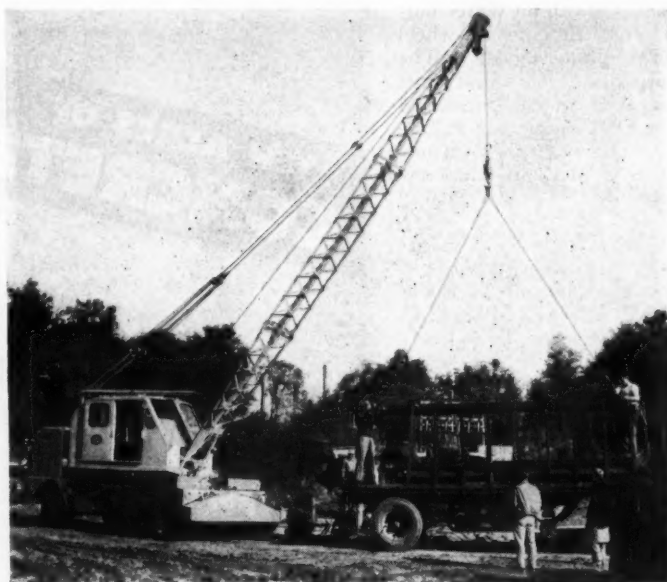
IDENTIFY YOUR EQUIPMENT WITH COLORFUL DECALS. THE MODERN METHOD OF SIGN LETTERING EQUIPMENT.

FOR INFORMATION AND PRICES DEPT. A



CONTINENTAL DECALCOMANIA CO.

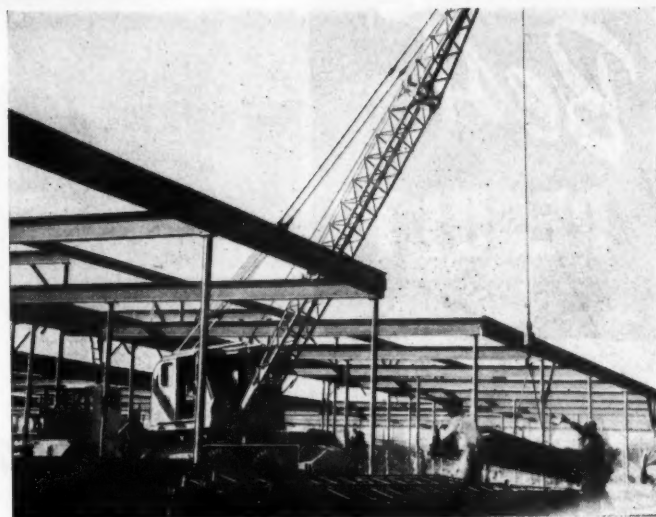
572-4 DIVISION AVE., S. GRAND RAPIDS, MICHIGAN



Four Jobs... ONE MORNING

- 1 Erect roof trusses
- 2 Unload cast-iron pipe
- 3 Set structural steel
- 4 Place prefab sheathing for roofing crew

F. H. MCGRAW COMPANY'S MICHIGAN TRUCK CRANE Keeps Crews Busy, Prevents Delays...



This single morning's work is typical of Michigan.

Although smallest of the cranes owned by F. H. McGraw Company, Inc., this Michigan 12-ton Truck Crane has worked on a wide variety of industrial construction jobs from Connecticut to

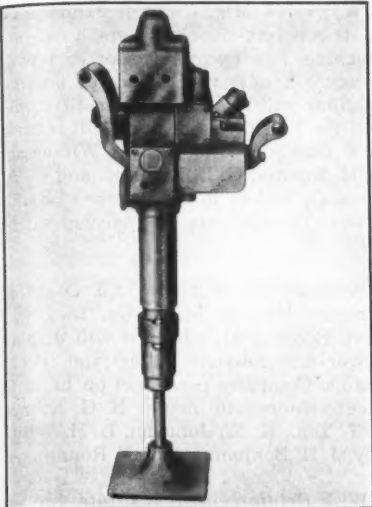
Illinois. To the complete satisfaction of its owner, it has proved an outstanding time-saver...

For your jobs, too, get the mobility, speed and dependable, economical performance of Michigan Mobile Shovel-Cranes. Send for full details.

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY

490 MILLER STREET • BENTON HARBOR, MICHIGAN, U. S. A.



No batteries are required for the new CP self-contained gasoline digger and backfill tamper, one of the featured units in Chicago Pneumatic's exhibit.

5-cubic-yard body and an F8C hoist; a Sterling HCS 195 powered by a Cummins HB600 engine, mounted with a Rex 5½-yard horizontal Moto-Mixer; a Sterling HWS 235 powered by a Cummins HB600 engine, and mounted with a Rex 5½-yard horizontal Moto-Mixer; and a Sterling Model DD115 powered by a Waukesha 6SRKR engine, and mounted with a Heil 5-cubic-yard body and No. 5 hoist. B. M. Myhre will have charge of the booth.

Tampo Mfg. Co. will exhibit models of its three-wheel variable-weight road rollers, its pneumatic-tire rollers, and its sheepfoot tamping rollers. G. A. Cooper will be in charge of Booth 3828.

The Texas Co., Asphalt Sales Department, will put on a photographic display at Booth 1027, showing the range of uses of Texas asphaltic products in the construction and maintenance of streets, highways, and airports. The following will be in attendance at the booth: D. R. Donlen, J. B. Stuart, T. R. Ellis, D. C. Arnold, L. M. DeLude, G. W. Robbins, J. T. Laffan, A. S. Nelson, A. J. Moynihan, R. J. Warg, and J. J. Smith.

The Thew Shovel Co., in its inside exhibit at Booths 1020, 1221, will illustrate the principle of unit assembly with a partially stripped Lorain TL20. Outside, it will show a Lorain 820 shovel, MC414 Moto-Crane, TL-20 dragline and a TL-20 Moto-Hoe.

Toncan Culvert Manufacturers Association will take up its headquarters at Booth 1004. On view for the first time will be new stronger sectional plate pipe and arches with 2-inch-deep corrugations. The display sections will have circumferential and longitudinal joints to demonstrate how they are lapped and bolted. A scale model of a corrugated-pipe culvert will actually carry water. And other products on exhibit will include the Tyton automatic gate, CorWel subdrainage pipe, and a section of 24-inch corrugated pipe. Representatives of 19 member companies will be at the Association booth on scheduled days. H. E. Snyder, Managing Director of the Association, will be in charge.

Toro Mfg. Corp. will show its Hiway mower at Booth 3032—also its power roller and various other mower models. R. W. Gibson, M. R. McLaren, and B. G. Reemelin will be at the booth to answer questions and show visitors around.

Twin Disc Clutch Co. will have sectionalized versions of its power-transmission units on view at Booth 1212. They will include the Model P-214 air-actuated clutch and Model B power take-off. There will be an exploded view of a 14.5-inch hydraulic coupling, the complete company line of small hydraulic couplings, Models CL and EH heavy-duty friction clutches, and a hydraulic torque converter. Executives and engineers of the company will be in attendance to explain the operation of the units and recommend solutions to power-transmission problems.

Union Metal Mfg. Co. will have Booth 1007, where it will exhibit its Monotube, tapered, steel foundation piling for cast-in-place piles. A miniature pile-driving rig will be shown in operation. The company will also exhibit its highway lighting poles. Representatives at the booth will include W. A. Porterfield, W. H. Robertson, D. T. Greth, M. B. Grant, J. W. Lewis, Syd Dewey, and J. R. Burkey.

Union Wire Rope Corp. will occupy Booths 1028-1030-1229-1231, where it will display Tuffy slings and draglines, and scraper rope. An electric train exhibit will show wire rope being delivered to fields of use. M. B. Hansell, Sr., and Ray G. Noble will be in attendance at the booth.

Unit Crane & Shovel Corp. will use

over 9,000 square feet of space, Booths 3815-3206A, to demonstrate its excavating and material-handling equipment. The Unit 1520 self-propelled Mobile Crane will be shown in public for the first time. The 514 ½-yard crawler will be displayed as a basic unit with the machinery deck exposed. The Unit 357 ½-yard Mobile Crane, both standard

and 4-wheel-drive models, will be shown with trench hoe, crane, and elevator attachments. The 1020 ¾-yard crawler and the 1014 truck crane will also be shown out-of-doors. Under cover there will be a full-size working model of the Unit one-piece cast gear case and full assemblies of Unit auto-

(Continued on next page)

Cutting WIRE ROPE is easy



the
MORSE-STARRETT
Way

SEE YOUR DEALER OR WRITE DEPT. "B"
MORSE-STARRETT PRODUCTS COMPANY
1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA

● **FAST** Specially designed cutting blade and dies assure fast cutting action. The hammer principle eliminates any special skill requirements.

● **CLEAN** Wire rope ends are cut smooth and clean for perfect threading or splicing.

● **SAFE** The enclosed cutting blade locked in the body of the cutter assures perfect safety.

● **PORTABLE** Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1 1/16 inch, 1 1/2 inch.

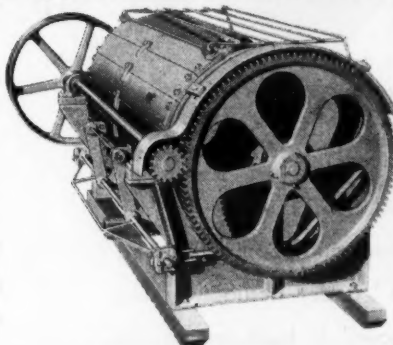
PUSH BUTTON BATCHING PLANT!

Here's a combination of mixer, skip hoist and aggregate storage so installed that maximum efficiency is accomplished with minimum of manpower. Same hoist used to charge one or more bins and then by electrically operated worm, handles and weighs batch and charges mixer or truck. Built for batching, central mixing and products plants or portable installations.

INDUSTRIAL STORAGE

Dodson concrete stave bins are ideal for storage of all aggregates. May be permanent or portable installation. Screw conveys aggregates to skip hoist batching scale.

Dodson Skip Hoists, Dodson-McCord Mixers and Dodson Bins may be purchased as a complete unit or as separate individual installations.



DODSON-McCORD MIXER

For more than 10 years the Dodson-McCord Bowl-less concrete mixer has enjoyed many repeat orders, thus proving the superiority of its design and operation. Interchangeable staves prevent shut down. All parts are replaceable. Repair parts available within few hours of your location.

LITERATURE ON REQUEST

DODSON
MANUFACTURING CO. INC.
MACHINERY DIVISION
1463 BARWISE - WICHITA 2, KANSAS

**WE'LL
SEE
YOU**



Booth 1238

**AT THE
ROAD SHOW**

**Contractors and
Engineers Monthly**

470 FOURTH AVENUE - NEW YORK 16, NEW YORK

Preview of Exhibits At ARBA Road Show

(Continued from preceding page)

matic traction brakes, hook rollers, clutches, etc. Company personnel at the booth will include A. R. Corbett, W. G. Larson, J. C. Novotny, Pat Harder, J. Lumley, H. Henwood, O. Lenahan, R. E. Boyle, and G. W. Mace.

Universal Engineering Corp. will show for the first time its recently announced TwinDual Master gravel plant featuring the TwinDual roll crusher which makes possible three stages of reduction in one portable plant. Universal will also exhibit at Booth 2616 its 546-P portable primary crushing unit.

Vulcan Iron Works will exhibit its pile-driving hammers and pile extractor at Booth 1204, where General Manager W. Daspit and Chief Mechanical Engineer C. V. Adams will be in attendance.

Walter Motor Truck Co. will give its first showing of four new models at Booth 2606—the AWUS, AGRL, and FZMS snow plows; and the Model AWVD tractor truck. President L. G. Stelzle, Vice President Maurice Walter, Sales Manager J. H. Sharkey, Western Representative George Morgan, and Canadian Sales Manager E. C. Bain will be on hand at the booth.

Wausau Iron Works will show its Model TM12-XF86 V-type snow plow and wing mounted on an FWD Model M7 truck, in space 2620. Another unit like it, on an Oshkosh 4-wheel-drive truck, will be in the Oshkosh Motor Truck Co. exhibit space 3832. Another Wausau snow plow will be exhibited by

the J. I. Case Co. N. R. Gahnz, C. P. Kraft, A. C. Keene, and R. J. Heinzen will be in attendance.

Wayne Crane Division, American Steel Dredge Co., Inc., will occupy Booth 3836, and will exhibit its Model 22 Crane power shovel. The unit has a ½-yard capacity, is rubber-mounted, and features hydraulic steering, 360-degree operation, and a full-vision cab. Don L. Douglass, Samuel H. Gifford, and Don C. Broadwell will conduct visitors around the exhibit.

Wayne Division, Gar Wood Industries, Inc., will exhibit in Space 3403 South Concourse, various models of its hoists and dump bodies, in both the medium and heavy-duty class. A complete line of winches, which range in size from 9,000 to 75,000-pound capacity, and cranes will also be on display. The newly announced Reel-Rite winch, with an automatic spooling and tensioning device, will be shown in operation. Other products in the exhibit will include a 1,050-gallon Marketer Tank, and a hoist for the conversion of platform, stake, and van-type bodies to a dump unit. There will be a complete parts display.

Wayne Motor Sweeper Division of Brown-Bevis Co. will have Booth 4311, and will exhibit the Wayne motor sweeper. W. G. Wiley will be in charge of the booth.

Wellman Engineering Co. proposes to exhibit three multiple-rope-type buckets, sizes 10M, 19M, and 40MR, and two dragline buckets, sizes 14L and 20X. The 20X bucket will be equipped with the Wellman Payload attachment. The company booth will be No. 3806, and W. C. Swalley, A. J. Lichtinger, H. E.



Fifty per cent larger than the Model H2 Hydro-Crane, the new Model H3—which Hydro-Crane Division of Bucyrus-Erie will display at its Road Show booth—is rated at 3 tons or ¾-yard capacity.

Keim, G. F. Thompson, and John E. Carlson will be in attendance.

Whiteman Mfg. Co. will exhibit two of its concrete-floor finishers, a rodding machine, and two models of its power buggy. A new type of power floating machine will be shown for the first time and the finishing machines will feature new improvements. M. E. Whiteman, T. H. Rhodes, C. L. Ramirez, and G. A. Teasdale will be in attendance at Booth 3848 to demonstrate, and answer questions.

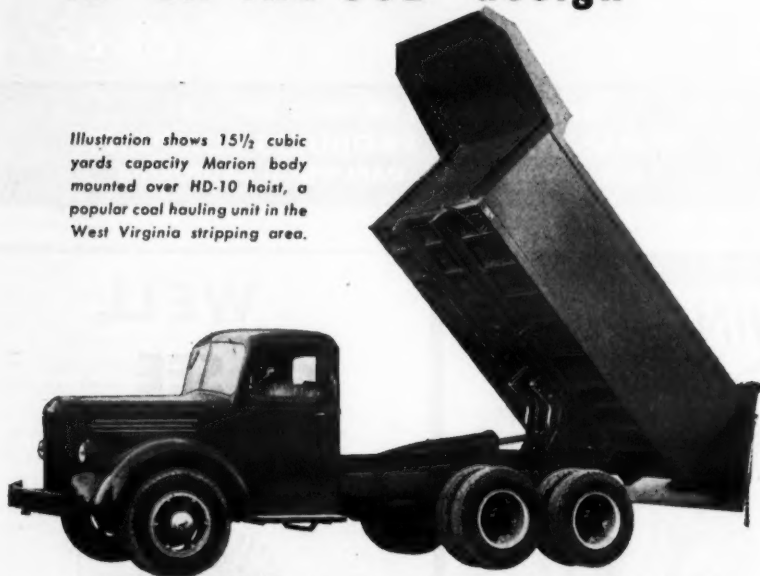
Whitney Chain & Mfg. Co. Division, Whitney-Hanson Industries, Inc., will have Booth 1604, where it will display power-transmission roller and silent chains. Company personnel on hand to greet visitors will include R. G. Atkins, E. T. Teal, R. W. Johnson, L. H. Whitney, J. H. Benham, and J. F. Rondinone.

Wire Reinforcement Institute, Inc., at Booth 1205, will show welded wire-fabric reinforcement for concrete pavements. T. J. Kauer will have charge of the exhibit.

(Concluded on next page)

there's field "Know-How" in "ON THE JOB" design

Illustration shows 15½ cubic yards capacity Marion body mounted over HD-10 hoist, a popular coal hauling unit in the West Virginia stripping area.



Marion field-experienced engineers analyze hauling and dumping problems right "on the job" under actual working conditions. This first hand "know-how" is built into every Marion Body and Hoist. This "On The Job" design is your assurance that Marion equipment is built to handle the "toughest" hauling or dumping job. For literature, prices and further information, write direct or to your nearest Marion Distributor.

MARION

DUMP BODIES and
HYDRAULIC HOISTS

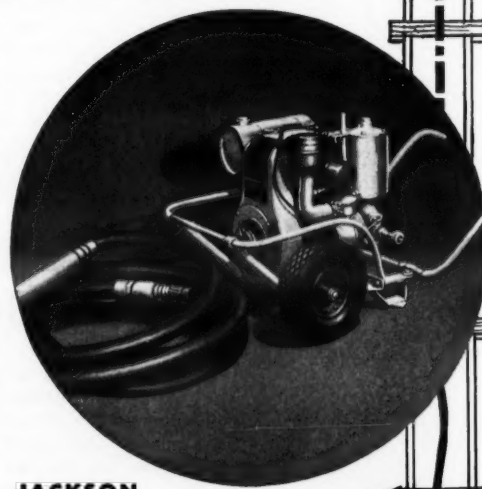
MARION METAL
PRODUCTS CO.
MARION, OHIO

The JACKSON HYDRAULIC VIBRATOR'S



This famous, time-proved concrete vibrator, which rates Ace-High with the vast majority of contractors, is now available with hose lengths up to 50 feet—a feature that saves plenty of time by making frequent relocations unnecessary.

Improved, interchangeable fittings permit reversing hose handle when vibrator end shows wear, thus doubling hose life and use. If you are not thoroughly acquainted with the Jackson Hydraulic, write for the complete facts, at once. With these at hand you will quickly recognize it as the most dependable, trouble-free vibrator in its class, ideally suited to general concrete construction.



JACKSON
CONCRETE VIBRATOR
Model HS-A2

There are no troublesome parts to break, and since all parts run in oil, no lubrication problem. It's powered by a husky Wisconsin engine and frequency is instantly adjustable from 4,000 to 7,000 VPM. But get the complete facts—write, NOW!



ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Wisconsin Motor Corp. will show for the first time its Models TE and TF 11 and 13-hp 2-cylinder air-cooled industrial engines. It will also display at Booth 1017 its 1, 2, and 4-cylinder air-cooled gasoline engines from 3 to 30 hp. Harry Cronk, Phil Norton, and Ray J. Fellows will be at the booth.

Gar Wood Industries, Inc., will have Booths 3603-3404-3403-3206. (For Findlay, St. Paul, and Wayne Divisions see previous listings.) The tractor equipment to be exhibited will include the Gar Wood Model 517 cable-controlled 4-wheel scraper; Model 25 hydraulic-controlled 2-wheel scraper; Model CT-101 cable Tipdozer with a CU-2 cable-control unit on an HD 10-W Allis-Chalmers tractor, with a Model C-80 cable ripper behind; Model RC-CX hydraulic Dozercaster; CU-1 cable-control unit; and a Model CU-240 cable-control unit. Gar Wood will also exhibit other models of its Tipdozers, Dozercasters, scrapers, bulldozers, and cable-control units in the Allis-Chalmers space.

Wooldridge Mfg. Co. will show for the first time the new Terra-Cobra self-propelled wagon. It will also show the Terra-Cobra self-propelled scraper, cable-controlled scrapers, power-control units, and rippers. Those in attendance at Booths 1856-3008 will be R. C. Caldwell, L. Crane, R. L. Jones, and W. J. Hart.

Yaun Welding & Dragline Buckets, Inc., will display basket-type, shell-type, and perforated buckets, along with an all-welded motorless tail-gate spreader and a new ditching bucket. The latter digs a sloping ditch specially suited for irrigation or drainage purposes. It is available in sizes from 7 cubic feet to 3 cubic yards, is all-welded, and is of a special design. Vice President and General Manager Clif Yaun will be at Booth 3858, along with his son Clif, Jr., and John Loupe.

1948 Standards on Cement

The 1948 edition of "Standards on Cement," is now ready for distribution by the American Society for Testing Materials. The booklet contains specifications and information on the five types of cement—portland, blast-furnace slag, natural, masonry, and air-entraining—and it also lists fifteen standardized methods of testing.

The pamphlet contains information on chemical analysis, compressive strength, fineness, autoclave expansion, sampling, air content, heat of hydration, normal consistency, specific gravity, soundness, tensile strength, and time of setting.

Supplementary material includes data on analytical balances and weights; a manual of cement-testing procedures; a list of references on portland cement; the principle of the methoxyl method for determining vinsol resin in portland cement; and a proposed method of testing for the setting time of hydraulic cement in mortar. The specification of sieves for testing purposes is also given.

This 200-page booklet, bound in a paper cover, may be procured by writing to the Society's headquarters at 1916

Race St., Philadelphia 3, Pa. Cost of the book is \$2.00.

Subgrade Excavator

A precision subgrader which excavates by vibration is described in a recent release of the Blaw-Knox Division of the Blaw-Knox Co., 2067 Farmers

Bank Bldg., Pittsburgh 22, Pa. Feature of Bulletin No. 2227 is a large 2-page spread showing the Model G subgrader and pointing out its principal features. Its major parts are listed and their operation explained. The parts so designated include the strike-off, operating controls, transmission, main frame, wheels, conveyor, hydraulic system, and

cutter assembly.

The folder has several photographs of the unit in operation, and others showing its construction. The rear page of the bulletin is devoted to the subgrader's specifications and dimensions.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.



*Here are hard driving facts
on Steel Sheeting*

Many experienced engineers and contractors know that ARMCO Sheeting helps them do a better job at less cost.

Light weight and a small displacement area make ARMCO Sheeting a fast-driving, cost-cutting tool on either temporary or permanent construction. You'll like the way it saves you time and money.

Both interlocking and flange type ARMCO Sheeting can generally be driven to full penetration before excavation. The corrugated metal design assures ample strength without excess bulk. It means easier handling, faster driving and lower costs.

Another big advantage is that on temporary jobs ARMCO Sheeting can be readily pulled and used over and over again. A convenient hole near the top of the section makes pulling easy.

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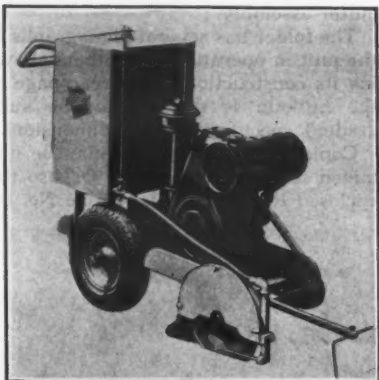
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Speeds up to 60 inches per minute, a diamond cutting wheel, and a depth of cut from 1 to 3 inches feature the Stratedge concrete cutter.

New Concrete Cutter

A concrete cutter said to operate at speeds of up to 60 inches per minute is made by the Backlin Products Co., 461 Washington St., Burlington, Wis. The Stratedge cutter has a depth of cut which can be varied from 1 to 3 inches. Control is obtained by an adjustable gage. The unit is powered by a 1-cylinder 6-hp Briggs & Stratton gasoline engine.

The Stratedge uses a diamond cutting wheel which is furnished in 10 and 12-inch sizes. It is cooled during cutting by a bath of water from a 19½-gallon tank. The chassis has two pneumatic tires in the rear and two solid wheels in the front. The unit complete weighs 395 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

Bulletin on Cone Crushers

Publication of a 4-page bulletin on the Symons Intermediate cone crushers has been announced by the Nordberg Mfg. Co., S. Chase and W. Oklahoma Aves., Milwaukee 7, Wis. These crushers are designed for use in rock, gravel, and ore reduction. A cutaway drawing shows the principal features of this line of cone crushers.

Bulletin 151 gives detailed data on the specifications of the crusher, as well as on its operation. One page describes also a packaged unit designed by the company. It is applicable for contractor service in portable or semi-portable operations, or for stationary plant operation.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 94.

Trailer Uses Illustrated

A bulletin describing its line of low-bed and dump trailers can be secured from The Trailmobile Co., California Division, 901 Gilman St., Berkeley 2, Calif. It features illustrations of the Trailmobile units in use on a wide variety of moving and hauling jobs.

Photographs show the Trailmobiles hauling steel girders, moving 150-ton defense guns, hauling cement and gravel, aggregate and hot-mix, etc. Also illustrated is the full-compensating rear suspension used on Trailmobile units.

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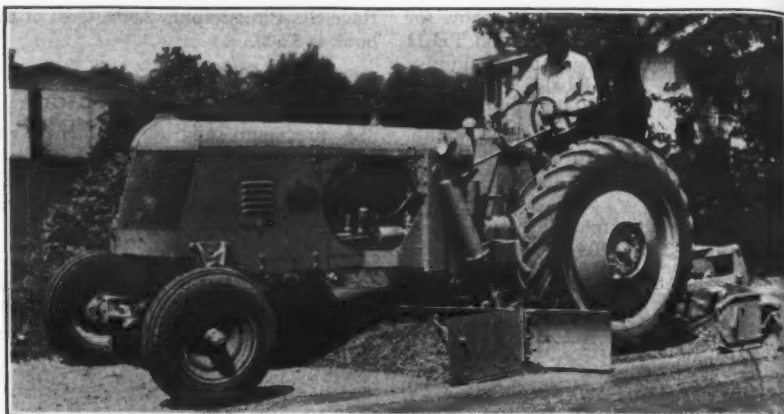
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Berm-Leveling Blade

A berm leveler for maintenance along hard-surfaced roads is announced by The Huber Mfg. Co. of Marion, Ohio. This one-man-operated unit is designed for use in conjunction with the standard Huber maintainer. It has a reversible assembly for boulevard and divided-highway maintenance, and it features an unobstructed view of the work being done.

Hydraulic controls operate the blade of the maintainer to the angle and depth of cut necessary to carry sufficient material to the pavement edge. An apron, or gathering blade, is bolted to the maintainer moldboard, and this carries excess material picked up in cutting the berms to ruts or low spots along the edge of the surfaced road. The rear wheel of the maintainer, running along the edge of the pavement, compresses this material.

The berm leveler, mounted on the rear of the maintainer, is adjusted by



This new berm leveler is Huber's latest addition to its line of auxiliary units for the Huber maintainer.

hydraulic control to the desired pressure for moving excess material and feathering it out to form a level berm, the manufacturer states. Small stones and dirt left by the berm blade are removed from the edge of the pavement

by a road-cleaner blade which is mounted on the rear of the lever attachment.

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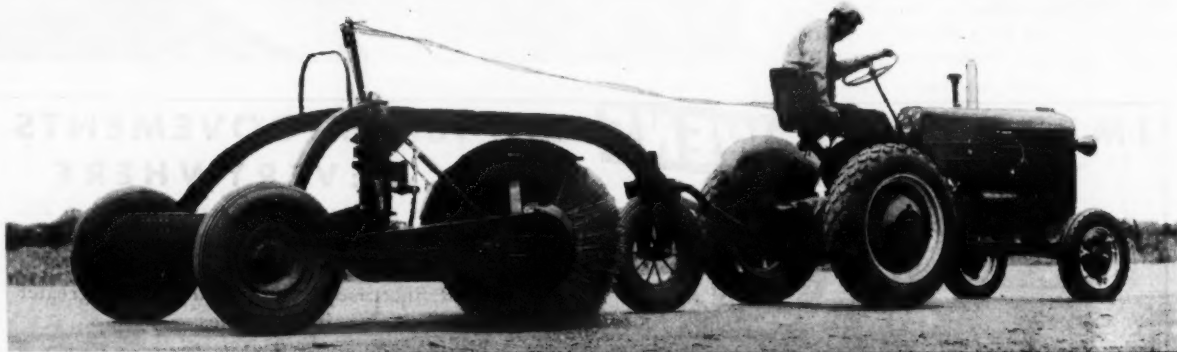
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Big Housing Project Has Pile Foundation

(Continued from page 2)

land, it also contained numerous obstructions such as timber docks and ferry slips that once rimmed the original shore line of the river. Stone-filled timber cribs were also encountered beneath the surface.

Below the 15 feet of filled-in land, an average 25-foot stratum of sand, or sand and gravel, is found. But under that are layers of silt, silty-sand, or sandy-silt of varying depths until either rock is reached, or else a course of good bearing sand that overlies the rock into which the piles are driven.

Other Contractors

Before any piles were driven, the excavation for the cellars was made to a depth of 4 to 5 feet below the level of the ground. This work was done by the Delma Engineering Co. of New York City, using the conventional shovels and trucks.

Other work includes a concrete slab averaging 3 feet in depth which caps each cluster of from 2 to 22 piles. The Corbetta Construction Co., also of New York City, has a subcontract to build these footings, and also to pour the concrete foundation walls.

The reinforced-concrete superstructure of the buildings will be constructed, under a subcontract, by the Knickerbocker Concrete Arch Construction Co. of New York City. The entire project is scheduled for completion by July, 1949.

Step-Taper Piles

The design for this foundation calls for a load of 30 tons per pile. The step-taper concrete piles which were used consist of 8-foot lengths of corrugated-steel shells screwed together to give the desired length. After they were driven into the ground using a mandrel or core, their hollow interiors were filled with concrete. On this project the length of piles ranges from 40 to 110 feet, with the average at 72 feet. They were driven as foundations for the building column footings. About 400 piles were driven under each apartment building, spaced as a rule on 2-foot 6-inch centers both ways.

The diameter of the pile shells varies, of course, with the total length of the individual pile. A typical 72-foot pile is made up of nine 8-foot sections with a 17 1/4-inch diameter at the top and 9 3/8-inch diameter at the bottom. With shorter piles the top section has a smaller diameter, and in longer piles this dimension increases. The shells have a thickness less than 1/8 inch.

Pile shells were fabricated by the Raymond Concrete Pile Co. in Youngstown, Ohio. From there they were shipped by rail to convenient transfer points where trucks picked them up and delivered them to the job. On this job, pipe was picked up at the Erie Railroad yards in Hoboken, N. J., and

yards of the New York Central System in Weehawken, N. J., or Port Morris in the Bronx, N. Y.

At the job site the 8-foot lengths of shells were assembled into piles on wooden shell racks. The ends of the shells were first coated with asbestos roof cement, around which a strip of burlap was wound. Then one shell was inserted into the other with a male and female joint, and the connection was tightened with a shell wrench. The wrench used was a hickory peavy handle with a length of rope which passed around the pipe. Only two men were required to assemble the piles and tighten the joints.

Four Pile Drivers

Four oil-burning steam-driven pile-driving rigs were used on this job. Two rigs had 48-foot booms and 96-foot steel leads, while two had 40-foot booms and 80-foot steel leads. All rigs were equipped with Raymond single-acting hammers with 5,000-pound rams.

(Continued on next page)



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Length of Bed, Front of Tires to Back of Drop—15' 6"
Height of Bed—31"
Width, Overall—8' 0"
Axle Spacing—40"
Kingpin—Heavy Duty Standard, Interchangeable
Axles—Heavy Duty Tandem, 5" Tubular.

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C. & E. M. Photos

Workers at left use a hickory peavy-handle wrench with a length of rope to tighten the joints on 8-foot lengths of step-taper piles. Above, the open-end bottoms of the piles are closed by welding steel plates to them.

Big Housing Project Has Pile Foundation

(Continued from preceding page)

They operated on crawler treads working on timber mats. The piles were picked up by the drivers and placed in the leads.

Before the pile was driven, however, a 3-inch-diameter jet pipe, 60 feet long, was jetted about 40 feet into the ground with 175 pounds of water pressure through a 1½-inch nozzle at the end of the jet. This process usually took from 3 to 5 minutes. Jetting through the upper layers of sand and gravel loosened this material, thus freeing the pile. Then when the pile struck the bearing material the difference was noted at once.

Water for the jetting came from hydrants in the street. But as this pressure was not great enough for the purpose, the line passed to a jet pump and then to the driver. Three Gould 6-inch 4-stage jet pumps, powered by Hercules gas engines, were used on the job. The pumps are rated at 500 gpm, and they had a reducer to hook up a 4-inch line leading to the driver.

The full driving force of the hammer was not applied directly to the step-taper pile but to a mandrel fitting inside the pile shell. For the 72-foot piles this mandrel was a forged tube with 2-inch walls; it was 76 feet long and tapered from 17-inch diameter at the top to 9-inch at the bottom. The hammer blows were transmitted from the mandrel to the shoulder or step rings of the shells at each joint. When the pile was driven, the mandrel was then simply lifted out of the shell.

Composite Piles

When pile lengths greater than 72 feet were required, a composite pile was used. This consisted usually of about 60 feet of step-taper shell on top, with steel pipe for the remaining length on the bottom. The steel pipe in 50-foot lengths was supplied by the Republic Steel Corp. It has a uniform diameter of 10 inches with walls nearly ½ inch thick, and is burned off at the

(Continued on next page)

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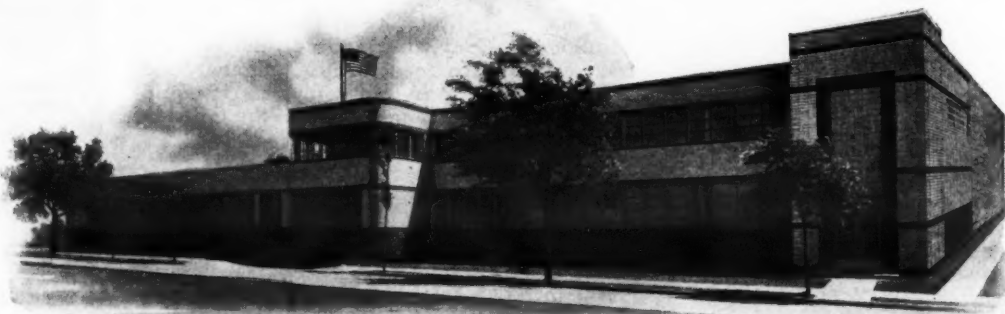
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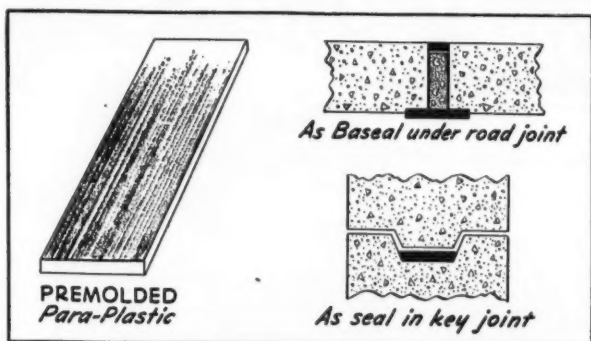
C. & E. M. Photos

At left, concrete is chuted into a pile shell on the Lillian Wald housing project from a Jaeger 5-yard truck-mixer mounted on a Mack truck. Above are some pile clusters waiting to be capped. The East River Drive is in the background.

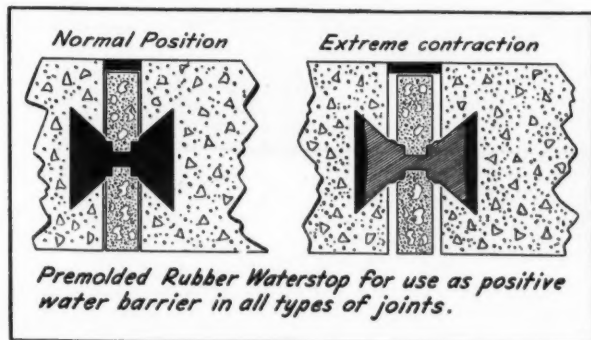
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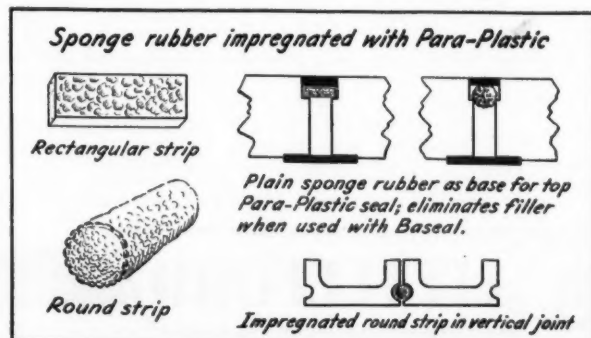
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The extruded rubber water stop was designed to replace the "metal dam" type of water stop. It has the definite advantage of being able to move with the concrete in contraction without losing seal. It will not crystallize or break in the joint. This water stop is recommended where seal against considerable water pressure is required, or wherever a dam is indicated in addition to the sealing material.



The offset joint as shown in illustration permits the use of a sponge rubber rectangular or round strip to be used as the retaining base for the top PARA-PLASTIC seal. Combined with Premolded Baseal Strip at the bottom of the joint, it provides a good joint without the use of a filler. The round strip in the lower sketch is impregnated with PARA-PLASTIC and serves as an excellent seal for vertical joints. The sponge rubber prevents cold flow of the seal.

required lengths. In the pile yard the open-end bottoms of the pipes were closed by welding to them a $\frac{1}{2}$ -inch steel plate, $11\frac{1}{2}$ inches in diameter. Job welding was done with three electric welders—two Hobart 300-amp and a Lincoln 200-amp.

With the steel pipe on the bottom and the shell on the top, a connection was made by a Raymond-designed sleeve, 18 inches long, with special self-locking features. In the longest piles, steel pipe up to 52 feet in length was used, connected to the shell sections. The composite piles were also driven with the mandrel which was withdrawn, leaving the pipe and shell in the ground.

The four rigs worked two shifts a day, five days a week, all through the winter. Snow and rain caused shut-downs, but the cold weather occasioned the loss of only two work shifts. The first shift started at 6 a.m. and worked to 2:30 p.m.—with a half hour for lunch; the second shift also worked eight hours, from 2:30 p.m. to 11 p.m. including the lunch period. For light during the night shift, six Little Red Devil 3-kw light plants were employed. Each plant was equipped with five pipe standards with three 150-watt spot bulbs at the top of each standard. Each rig drove an average of 25 piles during the two shifts.

Fill With Concrete

Before any concrete was placed in the piles, they were first carefully inspected and, where necessary, pumped dry. When the amount of water in the shells was small, it was generally bailed out by a small cylindrically shaped bucket dropped into the pile from a tripod rig set up on the ground over the open pile.

In the case of a lot of water, the piles were cleaned out with an ejector, a Raymond piece of equipment that operates on the siphon principle. The ejector was lowered into the shell and live steam passed through it from a 1-inch hose line hooked up to the boiler on the driver. The steam passing through the ejector created a vacuum, thus sucking up the water and forcing it to the top through a $1\frac{1}{2}$ -inch fire hose. Water is blown out with this device from depths of 100 feet.

The water was led away to sewers in the surrounding streets. The excavation holes in which the rigs were driving the piles were pumped out with Marlow 3-inch Mud-Hog pumps.

When the shells were clean and dry they were filled with concrete delivered to the job in truck-mixers of the Transit-Mix Concrete Corp. An average of eight truck-mixers was used in the haul from the commercial plant at 23rd Street and East River Drive. The hauling time was 15 to 20 minutes, but the batches were mixed for only 10 to

(Concluded on next page)



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C. & E. M. Photo
At left is Francis X. McCarthy, General Superintendent for HRH Construction Corp. And beside him is Tex Nilsen, Superintendent for the Raymond Concrete Pile Co., which handled the subcontract for the pile foundations for the Lillian Wald Houses.

Big Housing Project Has Pile Foundation

(Continued from preceding page)

12 minutes. The concrete was chuted directly into the piles, 2½ yards being required to fill a 72-foot pile. During the cold weather both the aggregate and the water were heated at the batch plant. After the pour the tops of the piles were protected with salt-marsh hay.

The dry weights of a typical 5-yard batch of 2,000-pound-strength concrete were as follows:

Cement	2,350 lbs.
Sand	6,835 lbs.
Gravel, 1-inch	10,100 lbs.
Water	188 gals.

Personnel

The Raymond Concrete Pile Co. employed an average force of 100 men, not including the supervisory personnel. Each of the four drivers had two operating engineers and two firemen for the double shifts, bringing their total crew to 16. Nine foremen directed the activities of the 40 dock builders and the 35 laborers on the pile-driving subcontract. Tex Nilsen was Superintendent for the Raymond Concrete Pile Co., and Alan Codd was Chief Clerk in the job field office.

Francis X. McCarthy is General Superintendent for the HRH Construction Corp., the general contractor, with George F. Hayden the Chief Engineer on the project. The New York City Housing Authority is represented at the Lillian Wald Houses by Alden J. Palmer, Project Superintendent.

Equipment Floodlight

A floodlight for use with shovels, excavators, tractors, and other road-building equipment is made by the Phoenix Products Co., Metal Spinning Division, 4715 N. 27th St., Milwaukee 9, Wis. It has a Sealed-Beam light unit and is made in three models for use with 4 to 6, 12 to 16, or 110 to 120 voltages.

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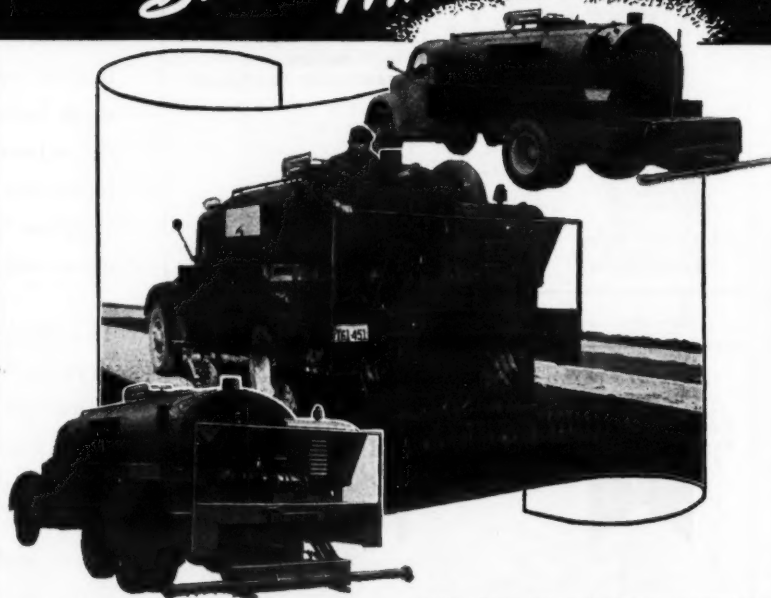
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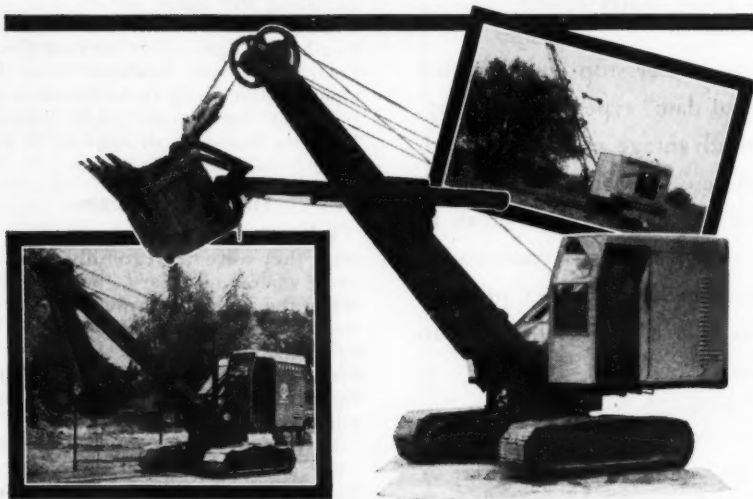


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Owatonna's new line of unit thread chasers includes eight large sizes. One handle fits all eight sizes of dies.

Unit Thread Chaser

Production of a line of unit thread chasers in eight large sizes is announced by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. They are recommended by the company for use in straightening or restoring battered or damaged threads on axle housings or shafts. The Model TC-18 handle is designed to fit all eight sizes of dies. The dies range in size from 1 3/4-16 to 2 1/2-16. Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 78.

Catalog on Safety Lenses

A catalog on its line of safety goggles, face shields, and welding shields has been prepared by the Welsh Mfg. Co., Troy St., Providence 9, R. I. It illustrates all the items in the Welsh line, and points out the individual features of each style and shape.

Catalog No. 48 explains the strength tests to which the Welsh lenses are subjected, and compares their impact resistance to that required by Federal specifications. It explains the principle of absorptive-type lenses, and shows how they absorb ultra-violet and infra-red rays.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 69.

Engine-Hour Meter Reads Hours, Minutes

Exact knowledge of how many hours an engine has run is important in proper maintenance of equipment, determining cost of operation, and so on. A meter which tells the accumulated number of hours and minutes of engine operation is made by the John W. Hobbs Corp., 226 Yale Blvd., Springfield, Ill. It comes in several styles to fit many different types of equipment and uses.

Hobbs engine-hour meters are made for use on dc in voltages from 6 to 115, with liberal voltage ranges for each model. Current can be provided by dry or wet cells. The meter will not operate off the magneto used for ignition. The mechanism of these instruments is driven by an intermittently powered motor whose armature winds approximately every 2 or 3 minutes. The meter has three hands which give readings in 100, 1,000 and 10,000 hours. A special meter is available with the three dials set to read in 10, 100, and 1,000 hours.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

SKF Picks Atlanta Manager

M. H. Courtenay is the new District Manager for the Atlanta territory of SKF Industries, Inc. He succeeds Nils Miller who recently retired after 30 years of service. The Atlanta district covers Florida, Alabama, Georgia (except for Richmond and Chatham Counties), 46 counties in central and western Tennessee, 56 counties in Mississippi, and 25 parishes in southeastern Louisiana.

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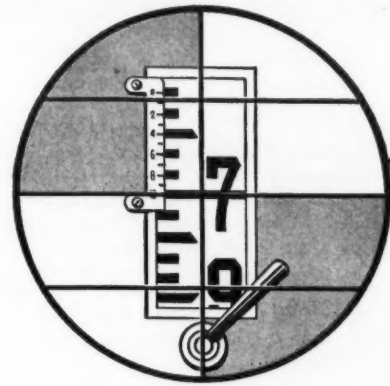
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Hot-Mix Topping Contains Iron Ore

(Continued from page 1)

cool the plant off. Looks bad heah. We'll lay what you got on the road. You bettah order asphalt and fill up, so we'll be ready to run when the weatheh cleahs. W-10-XCX. Oveh and out."

Dan Dyess replaced the transmitter on the radio set in his Ford. He had just saved enough money to pay half his payroll cost for that day. Because of the radio hook-up between the superintendent, the paving boss, and the asphalt plant, trucks could haul 22 miles in changing weather without wasting a load of hot-mix asphaltic concrete. Now, for the first time in his many years of running this work, Dyess could be effective anywhere in a 40-mile radius. To him, it was the most outstanding improvement in running a job he had ever seen.

As a matter of fact, the job Dyess was on was a bit out of the ordinary when viewed from almost any angle.

To start with, his asphalt plant was set up out in the woods. Dyess had taken it out there to the aggregate. Then, too, the aggregate wasn't the usual run of rock. It was pit-run iron ore, with a high affinity for water. And the shrewd old superintendent had quickly uncovered and stockpiled about 25,000 cubic yards, stacked it 28 feet high, and covered it with tarpauling while it was dry.

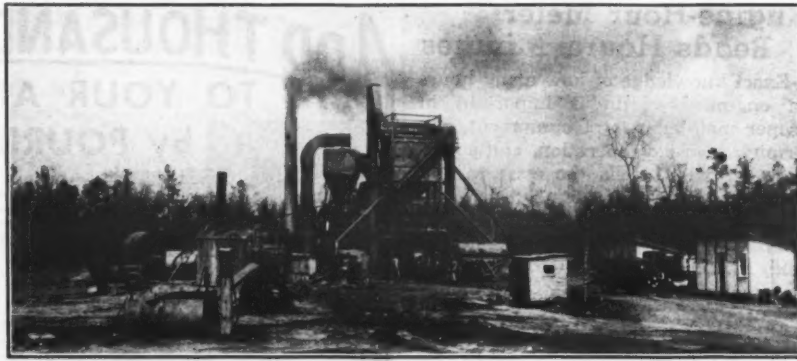
Now, with winter dampness in the air, he knew his plant could still put the stuff out at high speed whenever he and his men could get a few good paving days.

Job Upper-Decks Old Road

Last year, contract forces came in on U. S. 59 about 40 miles north of Houston, Texas, and concreted a widening strip 3 feet wide on each side of the 18-foot concrete pavement. Traffic counts were rising. The old road had to be improved.

When that work was done, the Texas Highway Department let a \$430,000 contract to Brown & Root, Inc., of Houston to upper-deck the old pavement with two courses of hot-mix asphaltic concrete, made with OA-90 and iron-ore topsoil aggregate. The Brown & Root contract also included special asphalt undersealing on about 25 miles of badly cracked and broken concrete pavement. The contract was 28 miles in length.

Dan Dyess had 175 days in which to finish the job, after work started on September 7 last autumn. By using radio communication, every break of the



C. & E. M. Photo
This general view shows the asphalt plant Brown & Root set up in the wooded area near Conroe, Texas, where there was a deposit of iron-ore aggregate. Note how much clearing was done to develop the site.

weather, and a tarpaulin roof over dry pit aggregates, he was able to run about 90 per cent of the job in the first 75 working days.

The job was laid in two lifts. A leveling course of 75 pounds of material per square yard was first dumped full width and spread to grade by a Caterpillar No. 12 motor grader. Then two 12-foot-wide topping strips, containing 100 pounds of asphaltic concrete per square yard, were laid by a Barber-Greene Tamping-Leveling Finisher.

Preparing for Topping

Some extensive repair work was necessary to get the old concrete pavement ready for topping. It had been laid in 1928, and had broken up quite badly over the years, despite normal maintenance. In some of the worst places, portable air compressors with pneumatic guns and moil points were used to chip out the old concrete. The old material and part of the mushy subgrade were removed, and a total of about 350 cubic yards of concrete patches went in.

A subcontract was then entered into with the Dallas firm of Wallace & Bowden for undersealing about 25 miles of the old pavement. Holes were drilled near the low joints of breaks, and the voids under the slab were pumped full of hot OA-30 asphalt, using a pressure of about 110 psi.

Two miles of the pavement were in extremely bad shape. Here special work was required. A new 8-inch-thick course of iron-ore sub-base material was laid in two lifts on top of the old concrete slab, and compacted. Trucks which hauled this material from the borrow pits at the asphalt plant had to travel 26 miles to deliver their loads.

After all undersealing, patching, and new sub-base reinforcement were finished, the old pavement was tacked. An

Etnyre pressure distributor with a 12-foot spray bar took hot RC-2 cut-back asphalt from one of the tanks at the asphalt plant, hauled it to the highway, and spread it at a temperature of 175 degrees. On the old concrete pavement only 0.05 gallon per square yard was applied to tack the new topping to the

old slab. The tack coat ordinarily stayed about a day's run ahead of the laydown crew, and traffic was permitted over the tack coat as soon as the distributor finished its work.

Since the passage of traffic through the job at all times was a necessity, Dan Dyess used from 3 to 6 flagmen to keep the cars moving on the lane not being worked. Barricades were placed about 150 feet ahead of the laydown machine and just in the clear of finished rolling. The position of these barricades was changed as often as the roller finished a piece of paving, to keep the work distance as short as possible.

Batch trucks had an average haul of 22 miles between the asphalt plant and the job. It was necessary to use at least 24 trucks on this haul to keep the material moving at high speed. The job saw some days when 1,280 tons were batched out of the plant in a 9-hour run, and this kind of production kept the laydown crew moving along about 18 feet per minute.

(Continued on next page)



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C. & E. M. Photos

Most of Brown & Root's hot-mix topping job was mechanical except for certain raking, shown in photo on left, to meet curb lines in the small town of Cleveland, Texas. Above, a Huber 3-wheel 10-ton roller compacts the bituminous mat.

Each of the batch trucks carried three 5,000-pound batches of asphaltic concrete, and was rented on a tonnage basis. The material sustained no great loss of temperature even though the loads were hauled uncovered. The trucks hauled generally over a hard-surfaced high-speed asphalt state-and-county highway, except for a short 2-mile gravel stretch.

When they reached the job, they backed in to the Barber-Greene Tamping-Leveling Finisher, and discharged gradually as that machine rolled itself and the truck ahead. On the first leveling course, the trucks spread their loads according to the designed basis of 75 pounds per square yard. State dump men and spotters assisted the truck drivers. As the hot material went down, a Caterpillar No. 12 motor grader under the expert hand of W. C. Green—one of the best grader operators in southern Texas, according to Dan Dyess—leveled it up to a true grade.

On the Barber-Greene machine, a crew was used consisting of 8 men and up to 6 flagmen. In the main crew were a foreman, a machine operator on the Barber-Greene, a screed man, a dump man, two rakers, and two roller operators.

The 100 pounds per square yard made a loose thickness of about 1 inch, which rolled down about 20 per cent under the action of the rollers. About 75 per cent of the initial compaction was put into the topping course by the Tamping-Leveling Finisher.

Except for certain raking to meet curb lines through the small town of Cleveland, Texas, the job was mostly mechanical. The longitudinal joint made where the two strips butted together was not raked. Instead, it was broomed with a stiff push broom. This removed the larger rocks and made for a very smooth joint.

The Barber-Greene screed was set to give an average crown of 1 inch in the center of the new roadway, to allow for drainage. Where the topping met certain widened street sections in Cleveland, this crown was flattened.

Compaction was worked on first by a Huber 3-wheel 10-ton roller, which stayed close behind the laydown machine. When the material started to flake, peel, or lift, the roller operator knew he was close enough to the Barber-Greene machine. Rolling with this 3-wheel machine was done to get at least two full coverages.

Behind the 3-wheel roller then came a 10-ton tandem Buffalo-Springfield, which also made a minimum of two complete coverages. Then, if any surface marks from the 3-wheel machine still remained, the tandem Buffalo-Springfield stayed on the job until all the irregularities were removed. Rolling was done longitudinally.

The Barber-Greene machine and its crew generally built the pavement topping complete as it proceeded, by laying one day's run on one lane and then catching up on the other lane next day. Wherever it was possible, Dyess tried to stagger his strips at about a half day's run, so that he would have a

completed roadway at noon. He would then go ahead on one lane as far as possible in the afternoon. In that way the machine did not have so far to travel back after the shift was over, and completed paving stayed closed up

as much as possible.

Excellent densities of 96 and 97 per cent of laboratory optimum were se-

cured, with stability test ratings of 47 to 49.

(Continued on next page)

Specially Designed DOWEL UNIT

Minimizes Load-Transfer Problems



Unit consists of two identical sections. Note dowels welded to side frame and center wire. When used as expansion joint, filler is mounted on dowels of one section, then unit is reassembled.

Bethlehem Dowel Unit comes completely assembled, ready for use as contraction joint. Unit keeps dowels aligned in horizontal and vertical planes. Dowel tubes (not shown) permit movement of dowels in concrete.

Here's the road joint you've been looking for—a lightweight bar-dowel unit that is specially designed to minimize the load-transfer problems caused by heavy wheel loads.

Called the Bethlehem Dowel Unit, it consists of two identical sections, in each of which evenly-spaced dowels are rigidly welded to the side frame and center wire. The sections slide together freely, and special tubes are then placed over the free ends of the dowels, allowing approximately 1 in. for expansion. The result is a unit which not only keeps the dowels accurately aligned in both horizontal and vertical planes, but also permits free movement of the dowels in the concrete.

The Bethlehem Dowel Unit saves time on the job, too, because it comes completely fabricated and assembled, ready for use as a contraction joint.

It can be handled easily by two men, and it also nests readily, making it economical to ship by rail.

or truck. It is adaptable to the designs and specifications of state highway departments, and can be used plain, as a contraction joint, or with the addition of joint filler, as an expansion joint.

All in all, the Bethlehem Dowel Unit is well worth looking into for highway or airport work. For details, contact the nearest Bethlehem sales office, or write to us at Bethlehem, Pa.

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Hot-Mix Topping Contains Iron Ore

(Continued from preceding page)

Iron-Ore Borrow Pit

Specifications for the hot-mix aggregates had been written around a peculiar deposit of iron ore in a heavily wooded area about 12 miles east of Conroe, Texas. Here the reddish-brown stuff lay almost on the surface of the ground, an average of 20 inches deep, covered only by a light layer of finer topsoil and by trees.

Studies made by the Texas Highway Department showed a possible production of about 1,200 cubic yards per acre. The entire area all around that point had been previously sampled.

The wooded area was crowded with pine, oak, pecan, small evergreen trees, and some light brush. The oak trees were from 35 to 60 feet in height, however, and up to 15 inches in diameter at the butt.

A Caterpillar D7 moved in with a LeTourneau bulldozer. It cleared all but the biggest trees. The big oaks were sawed down and piled, and the stumps excavated and pushed out by the bulldozer after some rather hard work. The space for the asphalt plant was first cleared. As soon as that was finished, Dyess had a 100-foot well drilled to produce the boiler feed water.

Clearing then proceeded for the production of iron-ore aggregate. A strip about 30 feet wide was cleared and stripped by the bulldozer. A Manitowoc 1½-cubic-yard dragline then moved in to pick up the 20-inch layer of iron ore, and load it to 5-yard dump trucks. Ordinarily no more than six dump trucks were used, since it was only about 1,200 feet from the center of the pit to the plant.

When this strip had been cleaned of its iron ore, the bulldozer began to cover it with brush and clearings from another strip. By a simple "cut and cover" system, the machines took the material clean as they went along.

While Dan Dyess is from Fort Stockton, in western Texas, he knows east Texas winters from long—and often bitter—experience. In September and early October the iron ore was all surface-dry, almost dusty. Dyess knew that if rain ever hit the material, the iron ore would soak it up like a sponge. And if that ever happened, he knew his plant drier output would drop possibly by 50 per cent.

He concentrated his early attention, then, on the production of iron ore. Never for a minute did he let up. The trucks shuttled back and forth between the pit and the plant. When they dumped their loads at the plant, an International TD-18 tractor with a Bucyrus-Erie cable-controlled bulldozer was there to stack the loads. The stockpile crept higher and higher, until Dyess had a pile 28 feet high, holding about 25,000 cubic yards. This was a sizable portion of the 37,000-cubic-yard aggregate total in the job.

Two heavy canvas tarpaulins, each 100 x 200 feet in size, were then purchased from a Houston awning company. They were hauled out and spread over the stockpile. The trucks continued to haul in the dry material and stock it near the plant, as long as the weather held out.

Dyess' idea was justified in a matter of days. Soon the first autumn rains began to fall. The exposed iron ore in the pit soaked it up and held it. Back roads at the pit became quagmires. But the big stockpile stayed powder-dry, and the minute the rains stopped long enough to dry up the highway, the plant was ready to run at full capacity.

Another peculiar problem was also neatly solved here. Many a tree root as well as smaller brush roots penetrated the iron-ore layer. None of this debris could of course be permitted in the mix, so Dyess, who has worked

with ore before, had a de-rooting plant built up in the company yard.

The de-rooter consists of a 10-ton steel feeder hopper, which drops the pit-run material to a 3 x 8-foot scalper screen with 1¼-inch square openings. This screen is vibrated by a 4-cylinder Le Roi engine. Roots, debris, and all oversize material were shaken down to a debris pile and removed by the TD-18 bulldozer to an unused portion of the area. The aggregates passed through the screen towards the plant. The feeder hopper was filled by a Lima Paymaster crane, which handled a ¾-cubic-yard clamshell bucket on its 45-foot boom.

Asphalt-Plant Set-Up

The asphalt-plant set-up consisted of

a 5,000-pound-batch Simplicity plant, with Symons classifying screens, a 100-hp steam boiler, storage tanks for fuel and asphalts, and various auxiliary

engines which supplied power and which will be detailed a little later.

Texaco No. 96 asphaltic paving cement.
(Concluded on next page)

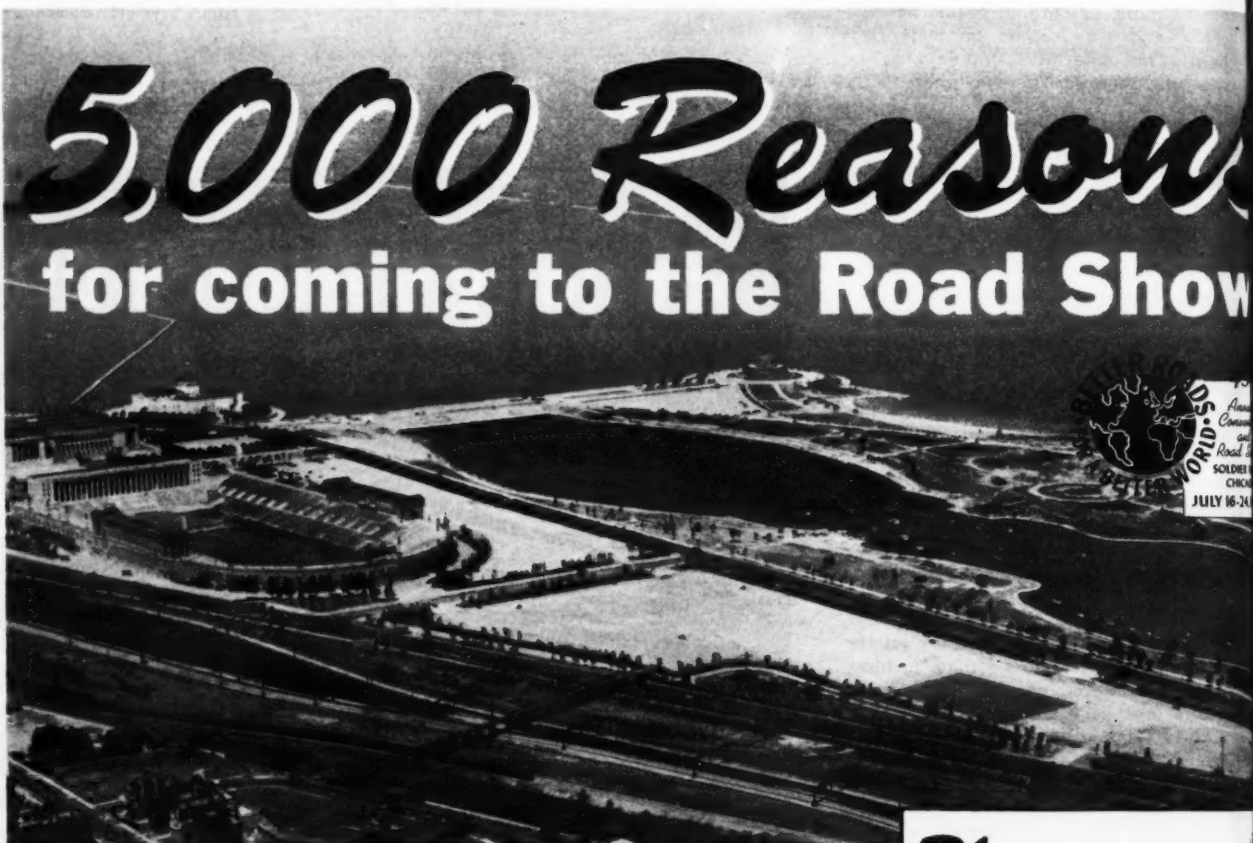
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Thursday, July 22 Municipal and Airport Day
Friday, July 23 All States Day
Saturday, July 24 Chicago Day

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ARBA-4

ment, known under state specifications as OA-90, was used for the hot-mix. It came from the Texas Co. refinery at Port Neches, Texas, and was hauled hot at pumping temperature to the job by 4,000-gallon tank trucks.

Plant facilities for storage included a 6,000-gallon horizontal steel tank for RC-2 tack-coat asphalt, a 16,000-gallon storage tank for OA-90, and also a 4,000-gallon hot well for this material. These horizontal tanks were heated by steam coils. An 8,000-gallon storage tank for the light grade of No. 4 heating fuel oil was also provided.

The tank trucks unloaded their asphalt to storage with the help of a Ford-driven Kinney centrifugal asphalt pump, but the material was handled from the hot well to the plant by a steam-driven Kinney asphalt pump. All asphalt feeder lines were insulated with asbestos covering, but the unloading lines were left bare.

Plant equipment included a 100-hp horizontal locomotive-type boiler, fired with Humble No. 4 heating oil. This boiler, which was centered between the asphalt plant and the asphalt-storage tanks, performed four main functions. It furnished steam to heat all the asphalt tanks, it powered one of the asphalt pumps, it furnished the power to operate the rams on pugmill gates, and steam was used to atomize drier-burner fuel.

The big 10 x 30-foot Simplicity single drier was operated by a Caterpillar D13000 diesel engine. An International UD-18 diesel operated the pugmill and elevators through a Falk reduction gear box. An International UD-18 also operated the dust-collector fan, which intercepted the fine particles and returned them to the mix. Smoke from the plant was clean, despite the fact that it was set up so far out in the wilderness where some dust would not have harmed anything but the fine content of the mix.

Movement of Material

In passing through the plant, the iron-ore aggregates dumped through the de-rooting screen to a 24-inch conveyor towards the plant feeder. This feeder controlled the amount of material required, and sent the ore to a cold-stone elevator. The buckets of this elevator passed the material up to the single drier, where the aggregate was heated to a temperature of 300 degrees F and all the remaining moisture was

taken out.

Hot aggregates then passed up an inclosed hot-stone elevator 45 feet high to the triple-deck classifying screens. Oversize material was rejected outside the plant at this point, and the aggregate was separated into four sizes. After being so classified, the material dropped down to storage bins above the weigh bucket. The aggregate was used at drier temperature almost at once, and put through the pugmill.

Asphalt from the 4,000-gallon hot well was circulated in a continuous loop to keep the hot bucket at the plant full at all times. Asphalt not used immediately by-passed back to the hot well.

A recording thermometer logged aggregate and asphalt temperatures constantly throughout the run.

The triple-deck vibrating screens used a 3/4-inch screen over No. 3 bin, a 10-mesh screen over No. 2 bin, and an 8-mesh screen over No. 1 bin. The plant had four bins, and all were used.

The hot-mix batches were controlled very carefully by State Highway Department inspectors at the plant. The mix had been designed according to the following percentage formula:

Screen Size	Per Cent of Mix
3/4 to 1/2	4.0
1/2 to 3/8	31.0
3/8 to No. 10	20.0
No. 10 to No. 40	6.0
No. 40 to No. 80	13.3
No. 80 to No. 200	15.0
Pass 200	6.2
Asphaltic cement	4.5

Mixing time was 45 seconds, after which the material was dumped to the hauling trucks. Three batches were discharged to each truck before it started out to the job. Each truck was weighed on platform scales before leaving, and the driver received a ticket which he delivered to the job. Drivers oiled the truck bodies as often as necessary whenever they returned to the plant.

The Simplicity asphalt plant on this job has a rich background of war work to its credit. It built the paving around the Red River Ordnance Depot and the Army airfield at Texarkana, and mixed material for the airport runways at Austin Municipal Airport, as well as many another highway job.

Taken all in all, this long job was one of which Dyess could be proud. Despite the limited amount of hot-mix material used, the finished surface was smooth, quiet, and easy riding. The sharp irregularities of pumping joints, and the longer looping differentials be-



C. & E. M. Photo
At the beginning of a day's run on U.S. 59 in Texas, Resident Engineer W. E. Carmichael and Superintendent Dan Dyess plan their procedure.

tween low spots had all been removed. The finished highway, now 24 feet wide according to 1948 standards, can accommodate traffic for several more years and will undoubtedly contribute much

towards traffic safety on that section of highway.

Personnel

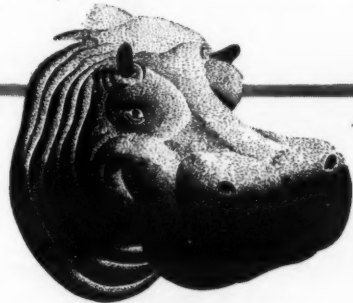
The project was designed and administered under the general supervision of D. C. Greer, State Highway Engineer, with Jed N. Robinson as State Construction Engineer and Jim Douglas in charge at Houston as District Engineer. W. E. Carmichael was the Resident Engineer, with Paul King in charge of laboratory test work at the asphalt plant.

Dan Dyess, General Superintendent of the job, was assisted by O. L. Dennis, Plant Foreman, and R. L. Florence as Road Foreman.

Wire-Rope Asst. Sales Mgr.

E. L. Klingler has been named Assistant Manager of Wire Rope Sales for The Colorado Fuel & Iron Corp., 500 Fifth Ave., New York City. He will assist A. S. Rairden, Manager of Wire Rope Sales, at Palmer, Mass.

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Conveyor Elevator For Contractors' Use

Materials-handling elevators for use by contractors are made by the Sam Mulkey Co., 1621 Locust St., Kansas City 8, Mo. The Mulkey elevator may be powered by either a 2½-hp gasoline engine, or a 1-hp electric motor. The elevator chassis is equipped with two pneumatic-tired wheels for rapid transporting at high speeds. According to the manufacturer, the elevator will hold a load of up to 400 pounds and can be used with materials such as sand, sacks of cement, bricks, concrete blocks, etc.

Mulkey elevators are made in basic lengths of 16 and 24 feet, with extensions available in 6, 14, and 22-foot lengths. Maximum height of the 24-foot elevator at 45 degrees is 17½ feet. Width of the unit across the chain is 16¼ inches; across the top flares, 23 inches. It weighs approximately 1,000 pounds. The speed reducer operates in a bath of oil and provides a reduction ratio of 16 to 1. Tensile strength of the

chain is listed at 2,100 psi.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

Data on Pipe-Tool Line

A 4-page catalog on its line of pipe-cutting equipment is being distributed by Beaver Pipe Tools, Inc., 1948 Dana Ave., Warren, Ohio. Among the items discussed are the Model No. 77 pipe threader for use with power drives, the Beaver knife cutters for power-drive use, and the Beaver geared power thread cutter.

The Model No. 77 is designed for use with pipes which have diameters ranging from ½ to 2 inches. The Beaver knife cutter is recommended by the manufacturer for cutting pipe at right angles, for grooving, or for beveling. The geared power thread cutter is designed for use with the larger-size pipes. The bulletin illustrates each of these and points out its principal features and uses. Bulletin No. 77 also

lists accessories and recommended tools available for use with these machines, and includes a price list and specifications.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 75.

Midwest Agent for Galion

Elmer B. Kelly has been appointed a District Representative of The Galion Iron Works & Mfg. Co. for motor graders and rollers in the states of Indiana, Michigan, and the northern half of Illinois. He will also retain his position as Sales Representative in the northwest part of Ohio.

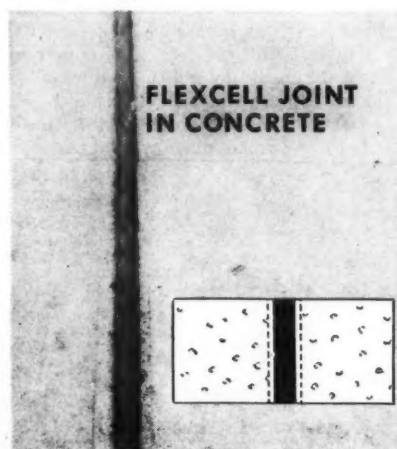
Actuating Cylinders

A line of actuating cylinders for oil, water, or air operation is announced by the Engineering Products Co., 1600 S. San Pedro, Los Angeles 15, Calif. A catalog describing these cylinders and the uses to which they can be put has been prepared and is now ready for free distribution.

Bulletin No. 481 lists twenty suggested uses for the Ledeén cylinders, explaining why they are adaptable to these uses. It also points out the various construction features of the cylinders.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 55.

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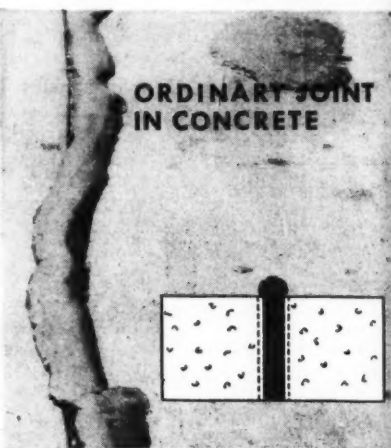
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- ✓ Durability proved by many years of actual use.
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- ✓ Adheres firmly to concrete. Provides neat finished joint.
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Lighter in weight. Stronger in structure. Safer in performance. Easier to handle and install. Greater over-all economy. Add to these advantages the fact that Naylor Pipe can be used in either high or low pressure service and you have the reason why contractors prefer Naylor to any other light-weight pipe. Sizes from 4 to 30 inches in diameter and thickness from 14 to 8 gauge.



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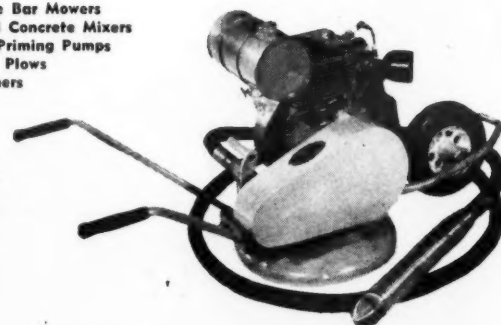
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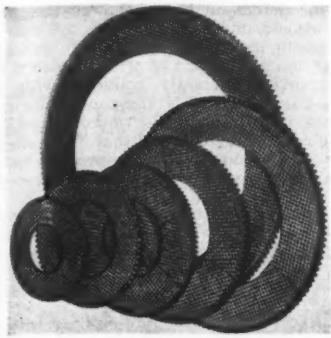


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A balanced combination of molded and woven asbestos is a feature of these Gatke clutch facings.

Molded Clutch Facing

Clutch facings which feature a balanced combination of molded and woven asbestos are announced by the Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill. The combination is achieved, the company explains, through a Gatke-developed process of assembling the woven asbestos with molding compounds before molding to the required shape and sizes.

This woven-molded type of structure is designed for the service requirements of excavating, road-building, and construction equipment. It is said to maintain a high frictional efficiency over a wide temperature range.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

Catalog on Steel Chain

Steel chain for use with elevating and conveying equipment is described in a catalog being distributed by the American Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Ill. In addition to covering the company's complete line of chains, Catalog No. 742-CN also contains a comprehensive description of the austenitic manganese steel from which it is made.

The bulletin describes the various types of chains in the line, and lists the sizes in which they are made.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 62.

Danville Plant Enlarged

Facilities at its recently built Danville, Ill., plant will be expanded by the Electric Steel Foundry Co., of Portland, Oreg. The company manufactures the Esco line of dragline buckets, power-shovel dippers, and related equipment.

New construction at the Danville plant will increase present floor area of the shops by about 125 per cent, and will include a new office building.

Oil-Filtering Equipment

Literature about the Engine-Life line of oil-filtering equipment is being distributed by the C. M. Fuller Co., 2043 Santa Fe Ave., Los Angeles 21, Calif. Features claimed for these filters include a built-in seal, sturdy bail, special alloy-steel core, triple-trap laminations, mesh - woven retainer jacket, micro-filtration, and replaceable element.

Each of these features is explained in detail by means of diagrams and text matter. The folder points out the purposes of each, and tells how they work together to obtain the proper filtering action. It also gives specifications and flow charts.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 77.

Roughing Tool Lays Skid-Proofing Bead

Slippery metal surfaces can be skid-proofed by laying a raised grid work on them. A vibrating electrode holder designed specifically for this purpose is made by the Metallizing Engineering Co., Inc., Safety Products Division, Long Island City 1, N. Y. The Metco Ruf-Tred tool can be used with either ac or dc welding machines operating at from 75 to 125 amps. It deposits a bead about 1/8 inch wide and 1/16 inch high, according to the manufacturer. This can be laid in any pattern desired, to give the greatest skid-proofing effect.

In operation, the end of the electrode is placed in contact with the surface to be roughened, and is drawn along at a rate of about 5 feet per minute. It is not necessary to hold the arc as in welding, it is explained, since the vibrator causes an intermittent arc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 101.

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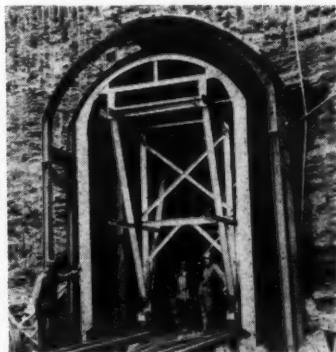
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Write for Bulletin No. 12

Mr. Micawber was only half-right!

MR. MICAWBER's financial advice to young David Copperfield is justly famous.

Translated into United States currency, it runs something like this:

"Annual income, two thousand dollars; annual expenditure, nineteen hundred and ninety-nine dollars; result, happiness. Annual income, two thousand dollars; annual expenditure, two thousand and one dollars; result, misery."

Mr. Micawber was only half-right!

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Each helps you build a nest egg of absolutely safe, 100% government-backed U. S. Savings Bonds. And these bonds make more money for you while you save. For after only ten years, they pay you back \$400 for every \$300 you put in them.

Join the Plan you're eligible for today! As Mr. Micawber would say: "Result, security!"

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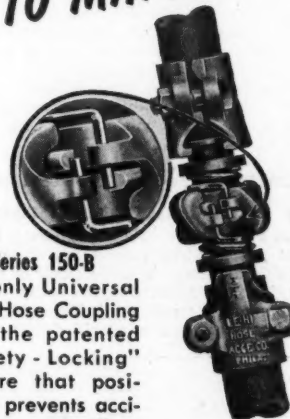


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Contractors and Engineers Monthly

470 Fourth Ave.
NEW YORK 16, N. Y.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney

When Is Subcontractor Independent Contractor?

THE PROBLEM: A subcontractor's employee was injured through negligence of a contractor's truck driver. Could he maintain an action for damages against the contractor, under the laws of Georgia and under the circumstances detailed below?

THE ANSWER: Yes, said the Georgia Supreme Court. The decision turned upon this point: was the subcontractor an "independent contractor" or was he an "employee" of the contractor? If the latter, then the injured man was a subemployee of the contractor, and was thereby limited to a claim under the Georgia Workmen's Compensation Act.

The decision that the subcontractor was an independent contractor was based upon these subsidiary conclusions: That relationship was not avoided because the contractor had a right to inspect the construction work as it progressed. Such inspection is exercised not as a means of controlling the subcontractor as to work methods, but of assuring the contractor that the spec are being observed. Nor was the subcontractor any the less an independent contractor because the contract provided that he should not employ workmen objected to by the contractor.

In short, the case fell within this general rule of law: that the relationship of independent contractor exists where an owner or general contractor has no right to control the method and manner of doing work beyond exacting a result conforming to the agreement. (Blair v. Smith, 41 S. E. 2d 133.)

Contract Not Superseded By Supplemental Agreement

THE PROBLEM: A subcontract on a Government job required completion June 1, 1945. But due to delays in other parts of the general job, the subcontractors were not able to commence work until May 18, 1946. A supplemental contract specified that the sub-

contractors did not waive damages claimed on account of being so delayed and scheduled damages assessable if allowable. Did the supplemental agreement supersede a clause in the original subcontract, to the effect that disputed questions arising under it should be arbitrated?

THE ANSWER: No, decided the United States Circuit Court of Appeals, Seventh Circuit, affirming a decision of the United States District Court for the Northern District of Illinois. (Lichter v. Goss, 163 Fed. 2d 1000.)

The result of the decision was that the court dismissed a suit brought by the subcontractors against the contractor, on the ground that their claim was one subject to arbitration. The decision also turned upon (1) provisions of the subcontract which exempted the contractor from liability for delays caused by the Government and (2) failure of the subcontractors to allege that the delays of which they complained were not so caused.

Drainage Contractor Held Liable to Owners of Land

THE PROBLEM: Local authorities of a town acted as virtual agents of landowners in contracting for drainage improvements. And the contractor was paid out of a fund created by assessing the landowners for benefits derived. Could the contractor be held liable to the landowners for a breach of the contract that prejudiced them?

THE ANSWER: Yes, said the Wisconsin Supreme Court. (Bradley v. Wisconsin Drainage Co., 181 Wis. 601, 195 N. W. 705.)

A landowner's complaint alleged that the contractor on the drainage project, which was in charge of the township board, failed to construct a ditch according to plans and specifications; that he left large quantities of rock in the ditches; and that an additional assessment was levied against plaintiff's (the landowner's) land to reconstruct the ditch according to such plans and specifications, etc. The court decided that the landowner's

complaint stated a legal right to damages. Said the court: "The defendant company, by its contract with the town board, owed a duty to construct the ditch in accordance with the terms of the contract. That was a contractual duty to the board, but under the contract it was for the benefit of the plaintiff and other property owners affected by the drainage. The town board owed the property owners affected the duty of requiring the contract to be fulfilled according to its terms."

But the defendant likewise owed the property owners under the contract the duty of performing its contract according to its terms. Under the allegations of the complaint, the defendant fraudulently colluded with the town board to violate these obligations to the plaintiff, whereby he was damaged."

The court therefore held that if the allegations in the complaint were proved, and if there was no excuse or justification, then the

(Concluded on next page)

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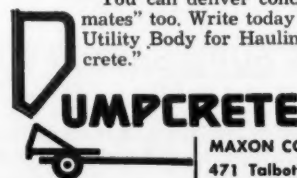


It looked like a high-cost job—laying telephone conduit down narrow alleys in Front Royal, Va. Wheelbarrows were figured for concrete placing, as heavy truck mixers would break down the trench walls.

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Avoid Legal Pitfalls

(Continued from preceding page)

plaintiff was entitled to recover the additional sum which he was assessed and compelled to pay in order that the drainage might be completed according to the terms of the original contract.

Materialman's Rights When Buyer Defaults

THE PROBLEM: A contractor canceled a partly performed contract to buy material from a sand and gravel company. The company proved that it had stockpiled the sand and gravel in anticipation of delivery; that it resold the material to others after the contractor canceled, and after rewashing the material at additional cost; and that existence of the contract before cancellation prevented disposal of the material elsewhere.

Under these circumstances, was the sand and gravel company entitled to damages against the contractor?

THE ANSWER: No. (Washington Sand & Gravel Co. v. Brann & Stuart Co., 162 Fed. 2d 826, decided by the United States Circuit Court of Appeals, Third Circuit.)

The court said that the evidence still left within the realm of speculation the question of how much profit was lost through cancellation of the contract, if any—especially since the sand and gravel were sold above the price fixed in the canceled contract. There was no proof as to how much of the material was re-processed nor as to the cost. It further appeared that the sand and gravel were subject to inspection by the contractor, who could have required that it be washed before accepting it.

Government's Liability For Delaying Contractor

THE PROBLEM: Article 9 of the Standard Government Contract form provides for extending performance time for delays due to unforeseen causes, including delays caused by the Government. Does this article relieve the Government from liability for such delays?

THE ANSWER: No, the United States Court of Claims has declared. (George A. Fuller Co. v. United States, 69 Fed. Supp. 400.) The court said it has never been "thought" that the article relieved the Government from liability in damages for such delays.

Surety Liable Though Bond Broader Than Law Required

THE PROBLEM: A contractor's surety was liable to third parties under a bond which secured payment of claims of such parties. Could the surety escape liability on the ground that the bond was broader than the statute required, and that a bond conforming to the statute would not render it liable?

THE ANSWER: No, according to a decision of the North Carolina Supreme Court. (Owsley

v. Henderson, 45 S. E. 2d 263.) But the court recognized that in at least two states—Louisiana and Ohio—the highest courts have decided that a statutory bond of this kind is not to be deemed to have been intended to afford broader security than required by the statute.

Speaking of the Georgia statute, the Supreme Court said: "The statute . . . was designed and intended to provide protection for laborers and materialmen, furnishing labor or material for the construction of public works, commensurate with that afforded them while engaged in private construction. It prescribes the minimum protection that must be furnished but does not undertake to stipulate the maximum. It provides a floor but not a ceiling. As to that the parties are free to contract. . . . Certainly this court will not read out of the contract protective provisions voluntarily incorporated therein by the defendant" surety.

Interest on Payment Is Computed From Acceptance

THE PROBLEM: Road contractors were not paid on completion of their jobs and acceptance of the same. Were they entitled to interest computed from the date of acceptance?

THE ANSWER: Yes, declared the Nebraska and Minnesota Supreme Courts in two distinct cases. (Appeal of Roadmix Const. Corp., 9 N. W. 2d 741, and Foley Bros. v. County of St. Louis.)

Under a state highway contract, the Nebraska court said: "While the general rule is that interest is not to be awarded against the state unless expressly so provided by statute or the terms of the contract, however, in this contract the state agreed to pay for everything furnished thereunder promptly upon the completion and acceptance of work and having failed to do so should pay interest thereon from the date of the acceptance."

In the Minnesota case, interest was allowed on a county road job from the date the county commissioners accepted the work, despite a statute providing that claims filed with the board were not payable until 15 days after allowance by the board. Said the Supreme Court: "When the work called for by the contract was completed and accepted as such by the board, the money earned was due and payable. There was no occasion to present a claim therefor to the board for any action."

Powers of Construction Superintendent Defined

THE PROBLEM: On a Federal housing project, a contractor's superintendent asked subcontractors to remove excavated material from the job site. That was not covered by their agreement. Did the superintendent have the right to bind the contractor to pay the subcontractors?

THE ANSWER: Yes. (Quinn v. Wilkerson, 195 S. W. 2d 399, decided by the Texas Court of Civil Appeals, Ft. Worth.) The general contractor contended that there was no proof that the superintendent had authority to request the subcontractors to remove the rock. The court answered:

The superintendent was a general superintendent; the principal contract required the

general contractor to keep him on the job. Since the general contractor was away, the subcontractors asked the superintendent to have the rock removed, so that they could proceed with their work. He said that he did not have the necessary equipment and asked them to remove the rock. That showed enough authority in the superintendent to bind the general contractor.

Effect of Conversations That Precede Contracts

THE PROBLEM: A subcontractor excused his refusal to carry out a contract to furnish all sand and gravel needed on a job on two grounds: (1) that men on the construction job refused to work because the material was not produced by union labor, and (2)

that before the contract was entered into, the sellers' representative orally agreed that the material to be furnished would be such as could be handled by union labor on the job. Was his refusal justified?

THE ANSWER: No, said the Illinois Appellate Court, Second District. (Palmquist v. Murphy, 73 N. E. 2d 644.)

The court applied a fundamental rule of law: that terms and conditions discussed in oral negotiations leading up to a written contract, but not embodied in it, are not binding.

The court decided that the sellers of the sand and gravel proved a sufficient basis for computing damages in their favor for the subcontractor's refusal to carry out the contract, by showing the yardage cost of producing and hauling the material, and the quantity that was actually used on the job.



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50 to 60 tons per hour capacity—located at Fall River, Mass.

Completely equipped with dust collection unit discharging into boot of hot elevator. Plant is equipped with 3-compartment cold storage hopper and feeder for regulation of feed into the dryer. 4' x 10' vibrating screen, 40-ton bin, 1-ton mixer, dial scales complete with all motors and drives.

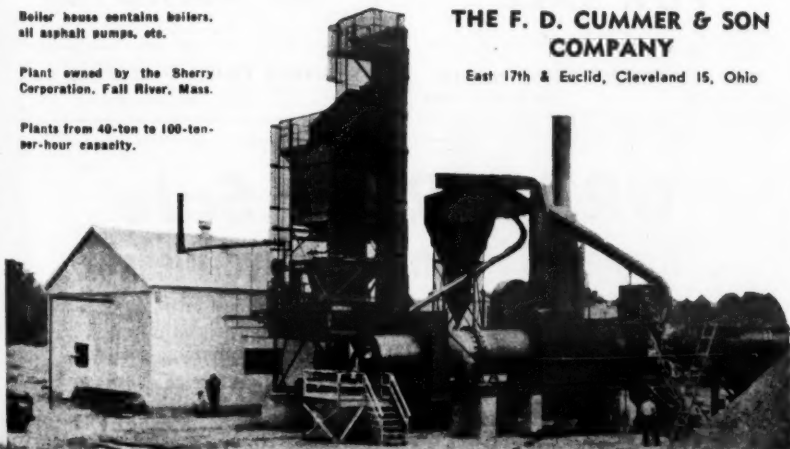
Boiler house contains boilers, all asphalt pumps, etc.

Plant owned by the Sherry Corporation, Fall River, Mass.

Plants from 40-ton to 100-ton-per-hour capacity.

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EASY SLAG REMOVAL. Slag is exceptionally easy to remove.

Wilson Arc Welding Electrode Catalog ADW-75 gives complete information on the No. 109, as well as all the other electrodes which make up the Wilson line. For your free copy, write us directly (Dept. CEM-8785) or your nearest Wilson distributor.

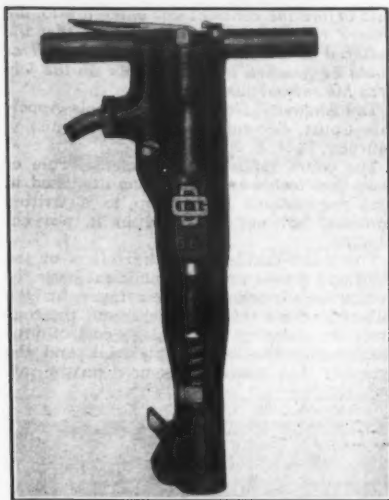


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General demolition work is this medium-weight concrete breaker's meat. It is a companion to Gardner-Denver's heavier Model B87. It weighs 63 pounds.

New Concrete Breaker

A medium-weight concrete breaker is in production by the Gardner-Denver Co., 102 Williamson St., Quincy, Ill. The Model B67 is a companion to the heavier Model B87, and is recommended by the manufacturer for general demolition work. It is designed specially for horizontal operations, for trenching in shale or hardpan, for preparing black-top for patching, etc.

The Gardner-Denver Model B67 breaker features a safety latch on the handle of the throttle valve and a lubricator with enough oil capacity for several hours' operation, the manufacturer states. It weighs 63 pounds, has an overall length of 23 inches, and can be fitted with chucks for either 1 1/4 or 1 1/2-inch hexagon tools.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Precision Tools

A 128-page catalog covering its complete line of precision tools has been prepared by The Lufkin Rule Co., Hess Ave., Saginaw, Mich. Catalog No. 7 illustrates each of the tools in the line and lists the sizes and styles in which it is made. These tools include all types of micrometers, calipers, surveying tapes, gages, markers, rulers, tool sets, and related items.

The catalog points out their special

features. It also contains 16 pages of engineering data for use in measuring and converting of figures. These data include tables of surveying measures, decimal equivalents, functions of circles and triangles, the metric system, wire gages, screw threads, pitch diameters, weights of bars, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 98.

Scale-Model Vehicle Tests Under Way at Stevens Tech

Tests to determine how motor vehicles operate in sand, loam, and clay soils are being conducted at the Stevens Institute of Technology in Hoboken, N. J. They are being run with small-scale models, and are under the sponsorship of the Ordnance Department of the U. S. Army. Officials of the Experimental Towing Tank are now trying to determine if these scale models can be used to predict accurately the behavior of full-size vehicles—as scale models are now used to study the behavior of ships and airplanes.

Towing Tank tests are made in a test bin 15 feet long, 18 inches wide, and 10 inches deep, filled with Norfolk sand and equipped with a dynamometer carriage. The results obtained will be checked against the results obtained by running full-scale equipment in test pits at the Army's Aberdeen Proving Ground, Md.

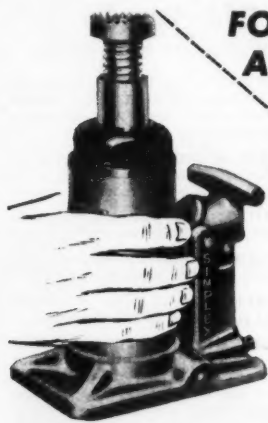
The project is in its initial stage, but results so far indicate that it will be possible to develop a successful method of model-vehicle testing. Test equipment and types of soils to be used are still being studied.

Cummins Elects Officers

Three new Vice Presidents and a new Director have been elected by the Cummins Engine Co., Inc., Columbus, Ind. They are: L. W. Beck, Vice President—Sales; D. J. Cummins, Vice President—Engineering; and W. M. Harrison, Vice President and Treasurer. Carl R. Fox will hold the position of Director. All other officers of the company were reelected.

All-State Sales Manager

Doswell Orin Winton is the new Regional Sales Manager in Michigan and Ohio for the All-State Welding Alloys Co., Inc., White Plains, N. Y.



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